TRAFFIC ENGINEERING

INSTITUTE OF TRAFFIC ENGINEERS
ITE
FOUNDED 1930

How to make hazards stand out white by day—bright by night

See how new White "Codit" Liquid stands out on the approach rails, bridge facing, and bridge rails in this photograph taken in full daylight. One application actually lasts up to two years.

Have you ever come upon a poorly delineated curve and then discovered half way through it that you were going too fast? Or have you ever found yourself in a tight squeeze on a bridge because you thought it was shorter than it actually was?

These are problems all drivers face—problems of unknown length. At night, particularly, they can be dangerous.

"Codit" Reflective Liquid can help solve these problems—by introducing a safety factor we choose to call "length delineation." The length of a bridge, a curve, an underpass can be shown at night by reflectorizing these hazards with effective, economical "Codit" Liquid that sprays or brushes on . . . just like paint!

New, White "Codit" Liquid

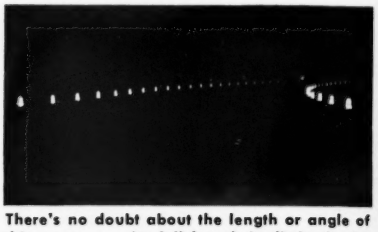
Now there is a new "Codit" Liquid that provides length delineation both by day and by night. It has all the advantages of our regular "Codit" Liquid—plus extra daytime visibility. It's *white* by day—and reflects *bright white* at night.

You still get wide angle reflectivity that can be seen from any angle of approach. Because "Codit" Liquid contains millions of reflex-reflectors, it catches approaching headlight beams and directs the gathered light right back to the source. The driver sees a warning that is 40 to 50 times brighter than white paint at night.

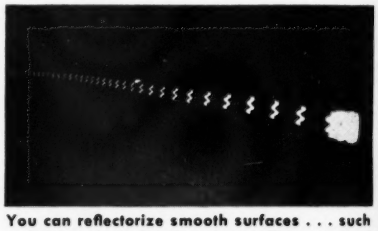
Application ease and low cost

Remarkably rugged "Codit" Liquid can be applied easily with spray gun, tank type spray equipment, or with a brush. You just spray it on or brush it on quickly in one step...it dries in minutes . . . and you've finished the whole reflectorization job. A little goes a long way . . . the cost is low . . . less than 17¢ per square foot of coverage.

You can get complete information on this versatile hazard marking material from your 3M representative. Or you can write to 3M Company, Dept. GS-59, St. Paul 6, Minnesota.



There's no doubt about the length or angle of this curve . . . its full length is distinctly delineated by "Codit" Liquid applied to each guard post.



You can reflectorize smooth surfaces . . . such as this steel guard rail . . . as well as rough or porous surfaces, with "Codit" Liquid.

"Codit" Reflective Liquid is applied in one fast step to warn drivers of roadside hazards in the dark. Note the fire hydrant marked for fast identification.

In this unretouched photograph of the same bridge at night, new White "Codit" Reflective Liquid clearly defines the hazard ahead, gives the driver visual "length delineation" for extra safety.

REG. U.S. PAT. OFF.

CODIT

BRAND

REFLECTIVE LIQUID

The term "Codit" is a registered trademark of 3M Company

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

ST. PAUL 6, MINN.

NEW

P&K 30-FOOT ALUMINUM TRUSS ARM

P & K IS ALWAYS FIRST WITH NEW IDEAS

James Colombo of Traffic Control Equipment Corp. Hackensack, N. J., P & K distributor:

This new Yonkers installation, one of my most recent jobs, is the type of progressive engineering I've come to expect from P & K. Naturally, as specialists in the design of traffic signal standards and spans, they are always at work, not merely keeping pace with traffic problems, but anticipating the requirements of traffic engineers everywhere.

controls wide intersection

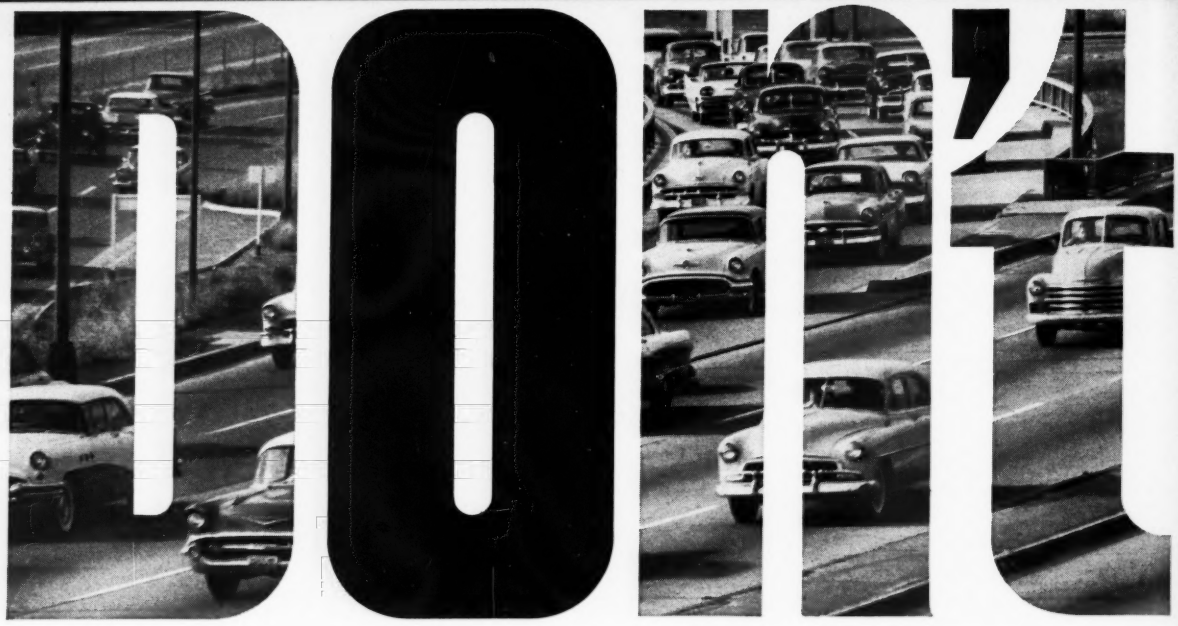
The photo above shows the busiest intersection in the city of Yonkers, modernized with a 5-lens signal-head. That's right—a 188-pound signal-head extends over this wide intersection supported by a modern 30-foot P & K aluminum truss-type-arm traffic signal standard. It's another first for P & K! Designed to speed traffic and reduce accidents, this new installation has done both!

And, *as a bonus in advance*, Yonkers enjoyed the advantage of simplicity of installation. After all, P & K aluminum standards and truss arms, though exceptionally strong, are light in weight. What's more, this modern unit never needs painting—will keep its good looks for years to come—a credit to the good judgment of the traffic engineers who selected it.

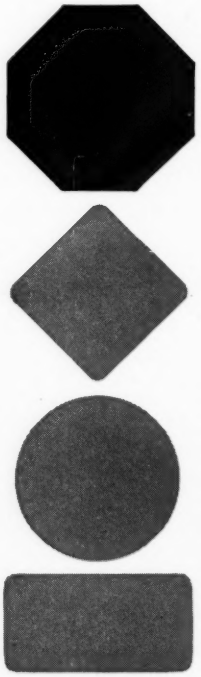
For more facts on this new 30-foot arm and the many other traffic signal and sign standards and spans made by P & K, write for Brochure TE-1.

P&K **PFAFF & KENDALL**
84 FOUNDRY ST., NEWARK 5, N. J.

BRANCH SALES OFFICES: MIAMI, FLORIDA; BURLINGAME, CALIFORNIA
IN CANADA: POWERLITE DEVICES, LTD., TORONTO, MONTREAL, VANCOUVER
EXPORT REPRESENTATIVE: PHILIPS EXPORT CO., NEW YORK, N. Y.



be penny wise, "pound" foolish, when it comes to signs! Lightweight aluminum signs may cost a little more—at first. But . . . because their strength and corrosion resistance cut upkeep and replacement costs to the bone . . . because their surface makes the ideal base for any message material . . . because their extreme light weight saves you money on shipping and installation . . . you end up many dollars ahead! For lowest lifetime cost you can't afford anything but aluminum!



KAISER ALUMINUM

Free brochure gives cost-saving facts and availabilities on traffic control signs made of Kaiser Aluminum. Mail coupon now.

KAISER ALUMINUM & CHEMICAL SALES, INC.
DEPT. 1078, 919 N. MICHIGAN AVE.
CHICAGO 11, ILL.

☐ Please send me your free aluminum sign brochure
☐ Please have a representative call in person ☐ phone

NAME_____
ADDRESS_____
CITY_____ ZONE____ STATE____

Let us make a bid. For expert service on cost-saving aluminum signs, call the manufacturer, fabricator or Kaiser Aluminum sign blank jobber near you.

Atlanta, Ga.
Municipal Fire & Safety Co.
Charlotte, Mich.
Paul H. Callender Co.
Chicago, Ill.
Bell & Gustus, Inc.
Federal Sign & Signal Corp.
Cleveland, O.
Osco Steel Co.
U. S. Steel Supply
Clinton, Mass.
Standard Sign & Signal Co.
Dallas, Tex.
All Quality Sign & Mfg. Co.
Elmira Heights, N. Y.
Eastern Metals of Elmira, Inc.
Evanston, Ill.
Northwest Screenprint Co.
Grand Prairie, Tex.
Sargent-Sowell, Inc.
Grandville, Mich.
Haven-Busch Co.
Houston, Tex.
Western Sign & Supply Co.
Indianapolis, Ind.
Midwest Fire & Safety Equipment Co., Inc.
Lancaster, Pa.
John I. Nissly Co.
Little Rock, Ark.
Moody Equipment & Supply Co.
Marion, Ind.
Jim Newey and Assoc.
Metairie, La.
W & A Engineers
Miami, Fla.
Biscayne Fire Equipment Co.
Milwaukee, Wis.
Milwaukee Steel Supply
Minneapolis, Minn.
Lyle Signs, Inc.
Monrovia, Calif.
Mask-Off Co.
North Tonawanda, N. Y.
Northern Electric Supply Co.
Oakland, Calif.
Hawkins & Hawkins Co., Inc.
Overland, Mo.
Wiegand Mfg. Co.
Peoria, Ill.
James P. Flynn Co.
Petaluma, Calif.
Kresky Signs, Inc.
Philadelphia, Pa.
Advertisers Service Co.
Rocky River, O.
Bowman Western Stamping Co.
St. Louis, Mo.
S. G. Adams Co.
Parco Supplies
St. Paul, Minn.
Gopher Stamp Co.
Tacoma, Wash.
Traffic Control Signs Co.
Wichita, Kan.
Miro-Flex, Inc.

With CATATHERM REFLECTIVE PLASTIC STRIPING you can STRIPE IT...AND FORGET IT

How often have you embarked on an ambitious striping program that goes something like this:

Plans are made . . . work crews assigned . . . and striping begins. The first job looks great . . . you're pleased and move on to the next spot . . . and the next . . . and the next. Work progresses on schedule and then . . . you revisit the initial starting point to find your beautiful striping job is no more. The traffic paint has almost disappeared. Already, it demands restriping . . . and your crews are tied up elsewhere.

There is a simple way to avoid this frustrating situation. Use Catatherm Reflective Plastic Striping. Composed of specially formulated plastic resins, pigment and over 55% reflective traffic beads, Catatherm is hot extruded directly and securely onto any pavement . . . is available in white and yellow.

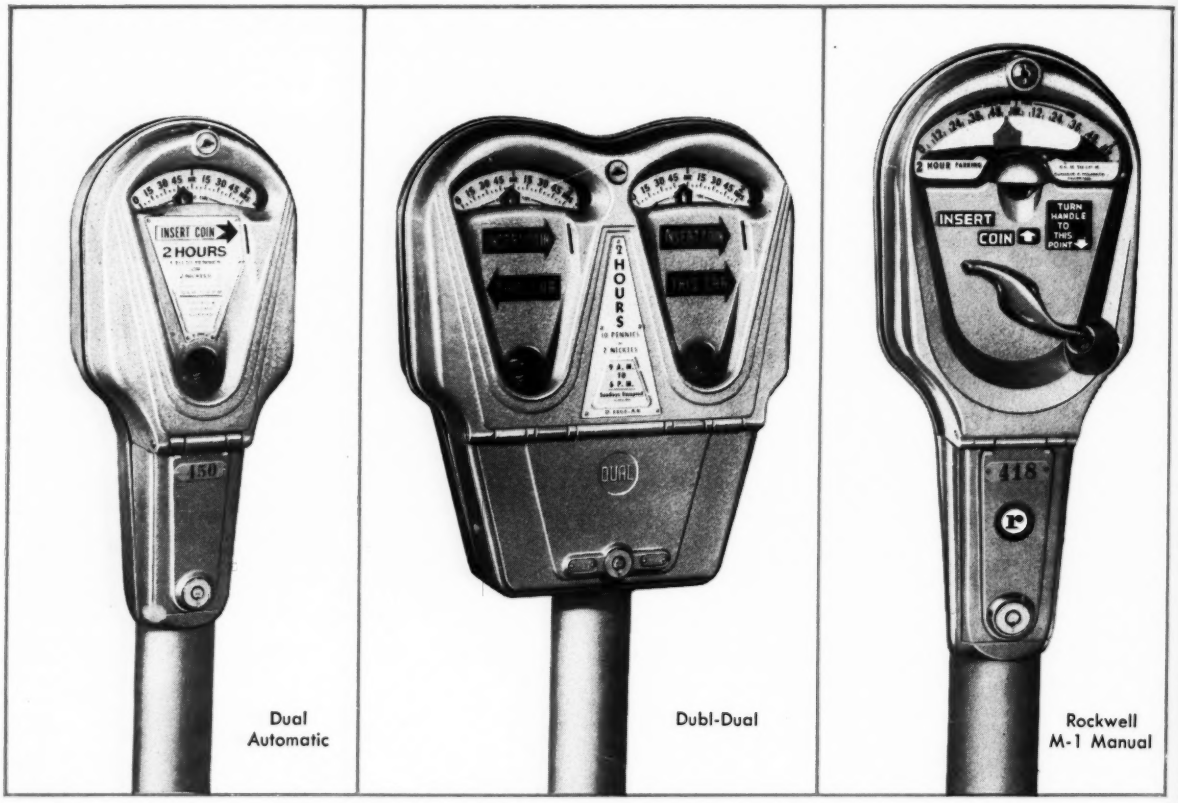
If you're interested in pavement markings that will outlast good quality paint stripes from 9 to 26 times . . . Catatherm is for you. Let us tell you more about Catatherm . . . how you can really "STRIPE IT . . . AND FORGET IT". Write today.

Cataphote
CORPORATION

TOLEDO 10, OHIO / JACKSON, MISSISSIPPI

Manufacturers of: CATAPHOTE REFLECTIVE BEADS • CATAFLEX REFLECTIVE COATING • CATALINE REFLECTIVE STRIPING
CATATHERM REFLECTIVE PLASTIC STRIPING • TRAFFIC SIGNS • STREET NAME SIGNS

On Street or Off Street . . .
Single or Double Meters . . . Automatic or Manual



WHATEVER YOU WANT

Rockwell Has the Meter For You

With the addition of the Rockwell M-1 Manual meter, the Rockwell-built Dual parking meter line gives even more flexibility for meeting a wide variety of metered parking needs. You can now select from single and Dubl-Dual automatic meters and the new Rockwell M-1 Manual that will take five coin combinations through a single slot. There's no need for compromise . . . you can get the meter *you* want.

If you are planning parking meter installations or replacement of existing facilities, why not have a Rockwell man call? He will show you special planning programs based on 25 years of parking meter experience and know-how. And he will show you why Rockwell-built Dual parking meters will produce more revenue through longer life and lower cost. Dual Parking Meter Company, Subsidiary of Rockwell Manufacturing Company, Pittsburgh 8, Pa.

DUAL PARKING METERS
another fine product by
ROCKWELL

SEND COUPON FOR FREE DETAILS

Rockwell Manufacturing Company
Pittsburgh 8, Pa.

_____ Please send details on the Dual Parking Meter line.
_____ Please have a Rockwell field engineer call.

Name: _____ Title: _____

Address _____

City: _____ Zone: _____ State: _____

TRAFFIC ENGINEERING

OFFICIAL PUBLICATION OF THE INSTITUTE OF TRAFFIC ENGINEERS

Vol. 29 MAY, 1959 Number 8

INSTITUTE OFFICERS

MATTHEW C. SIELSKI
President

EDWARD G. WETZEL
Vice-President

A. F. MALO
Vice-President

GORDON K. GRAVELLE
Secretary-Treasurer

DIRECTORS

EUGENE A. BARTON
District Number 3

MICHAEL J. GITTENS
District Number 2

M. V. GREER
District Number 5

J. AL HEAD
District Number 6

FRED W. HURD
District Number 1

WILLIAM R. MARSTON
District Number 4

JOSEPH E. HAVENNER
Immediate Past President

PUBLICATION STAFF

DAVID M. BALDWIN
Editor

G. A. BACCHUS

J. W. CHAMBLISS

C. C. CLARK

WM. E. CORGILL

R. E. DUNN

MAX R. HOFFMAN

M. J. HUBER

E. A. MUELLER

C. C. ROBINSON

S. T. SIEGEL

BURT WHEDON

Associate Editors

CONTENTS

FEATURES

Coordinating City Planning and Traffic Engineering 11
Matthew C. Sielski

Sign Standards for the Interstate Highway System 13
William G. Eliot, 3d

Safety and Economic Aspects of Expressway Construction in Michigan 17
Gerald Wm. Graves

The FCC and Radio Control of Traffic Devices 23
Joseph E. Keller

NEWS

Training Opportunities 12
Traffic News 25
New Appointments 32
Strictly Business 36
New Publications 46
Coming Events 54

TECHNICAL NOTES

Toll Road Accident and Fatality Statistics 44
Seeing and Driving 46

INSTITUTE AFFAIRS

Oregon and California Seminars 47
Section News 48
Membership Applications 52
Yearbook Changes 52

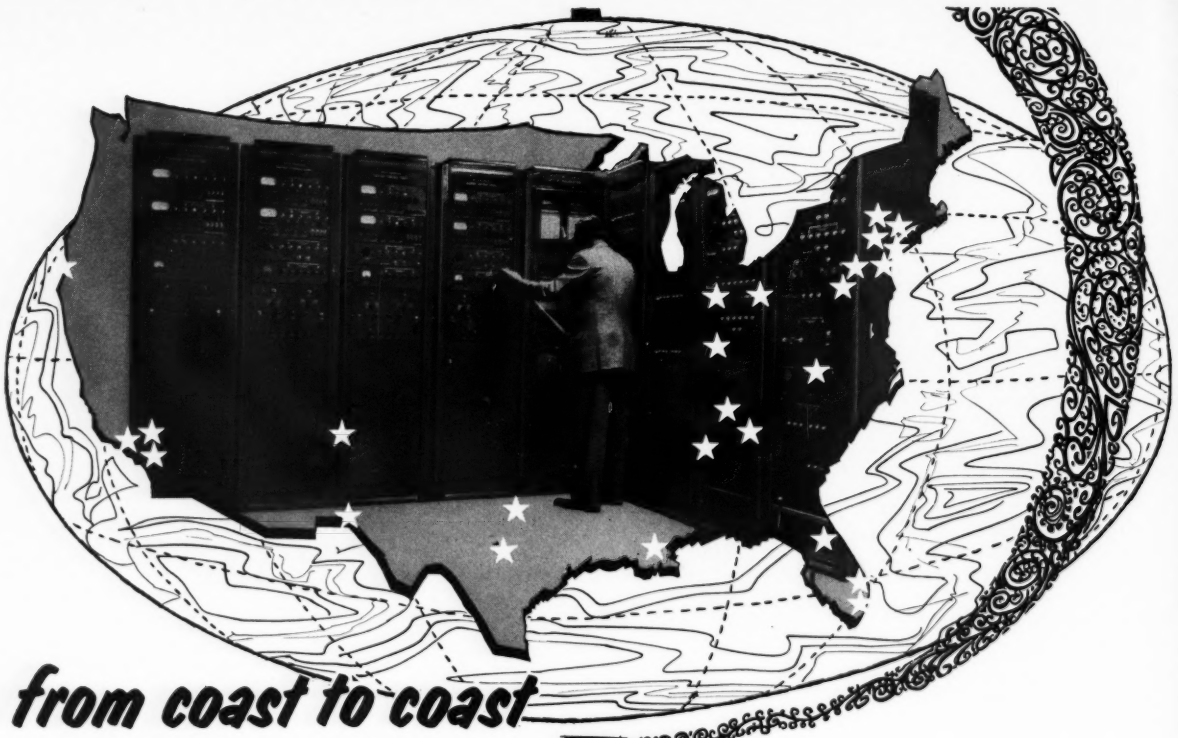
MISCELLANEOUS

Positions Available 36
Sustaining Organizations 54
Professional Service Directory ..... 58 & 59
Index to Advertisers 58

COVER: A section of the recently opened 6-mile, 12-million dollar freeway, part of the Interstate System, through Olympia, Washington. —Photo by Washington Department of Highways

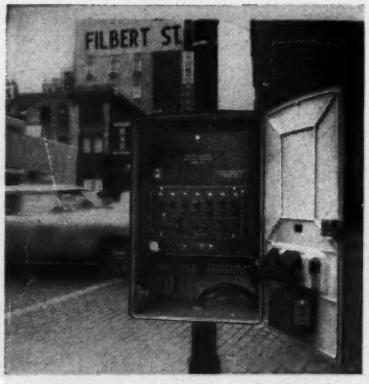
TRAFFIC ENGINEERING is published monthly by the Institute of Traffic Engineers. Editorial offices are at 2029 K Street NW, Washington 6, D.C. Advertising plates should be sent to Interstate Printing Corp., 400 Watchung Avenue, Plainfield, N. J. Advertising representatives: New York—Seymour A. Robbins & Associates, 489 Fifth Avenue, N. Y. 17. Chicago—Scott Kingwill & Associates, 35 E. Wacker Drive, Chicago 1. Los Angeles—Jess M. Laughlin Co., 3142 Wilshire Blvd., Los Angeles 5. Entered as second-class matter November 7, 1941, at the Post Office at Plainfield, New Jersey, under Act of March 3, 1879. ¶Single copies 50 cents, subscription price $4.50 per year in the United States and Canada; $5.75 per year to foreign countries.

The Institute is not responsible for any statements made or opinions expressed in its publications. Publication of advertising does not constitute Institute approval or endorsement of the products or services advertised. Permission to reprint contents with customary credit line is given unless otherwise stated. The Institute seal, pictured at the upper left on this page, is a Registered Trade Mark of the Institute of Traffic Engineers.



from coast to coast

PR *system of traffic signal control*



Here is the ultimate in coordinated traffic control for cities and towns. Detectors at strategic locations sample key traffic flows for the centrally located Electro-Matic® Master.

Highly developed computing circuits* of the Master analyze the data, and send instructions to the all-electronic PR Locals at each intersection being coordinated. The most effective timing pattern for changing traffic conditions is maintained *continuously . . . automatically . . . reliably.

For full details, write for Bulletin E-224.

TRAFFIC ACTUATED ®

AUTOMATIC SIGNAL DIVISION

EASTERN INDUSTRIES, INCORPORATED

NORWALK • CONNECTICUT

Frankly Speaking . . .

A CONVENTION IS "a body of delegates, representatives, members, or the like, periodically convened for a common purpose". While this may be the accepted dictionary definition, we of the I.T.E. know that it falls short of describing our Annual Meetings. What would be a proper definition? To find out, let's see just what goes into the making of an I.T.E. convention.

The prime ingredient is, of course, a broad and varied program of Technical Sessions. Here, our members have the opportunity to find out what the other fellow is doing. New, and oft times controversial, thoughts are presented for consideration. This naturally leads to worthwhile discussion and a healthy interchange of ideas between people who frequently find themselves pursuing only one phase of the already specialized field of Traffic Engineering. It is often said that you can't "teach an old dog new tricks." No one can attend our Annual Meeting, and go away without the assurance that this timeworn adage cannot be applied to us.

Added to this, is the fact that consideration and discussion of new ideas and methods presented at the Technical Sessions ranges far and wide through the meeting site. In this way, members may devote unlimited discussion to the pros and cons of methods and procedures. It is no overstatement to say that anyone who participates in such an experience will come away with a broader understanding and appreciation of his chosen profession and its aims.

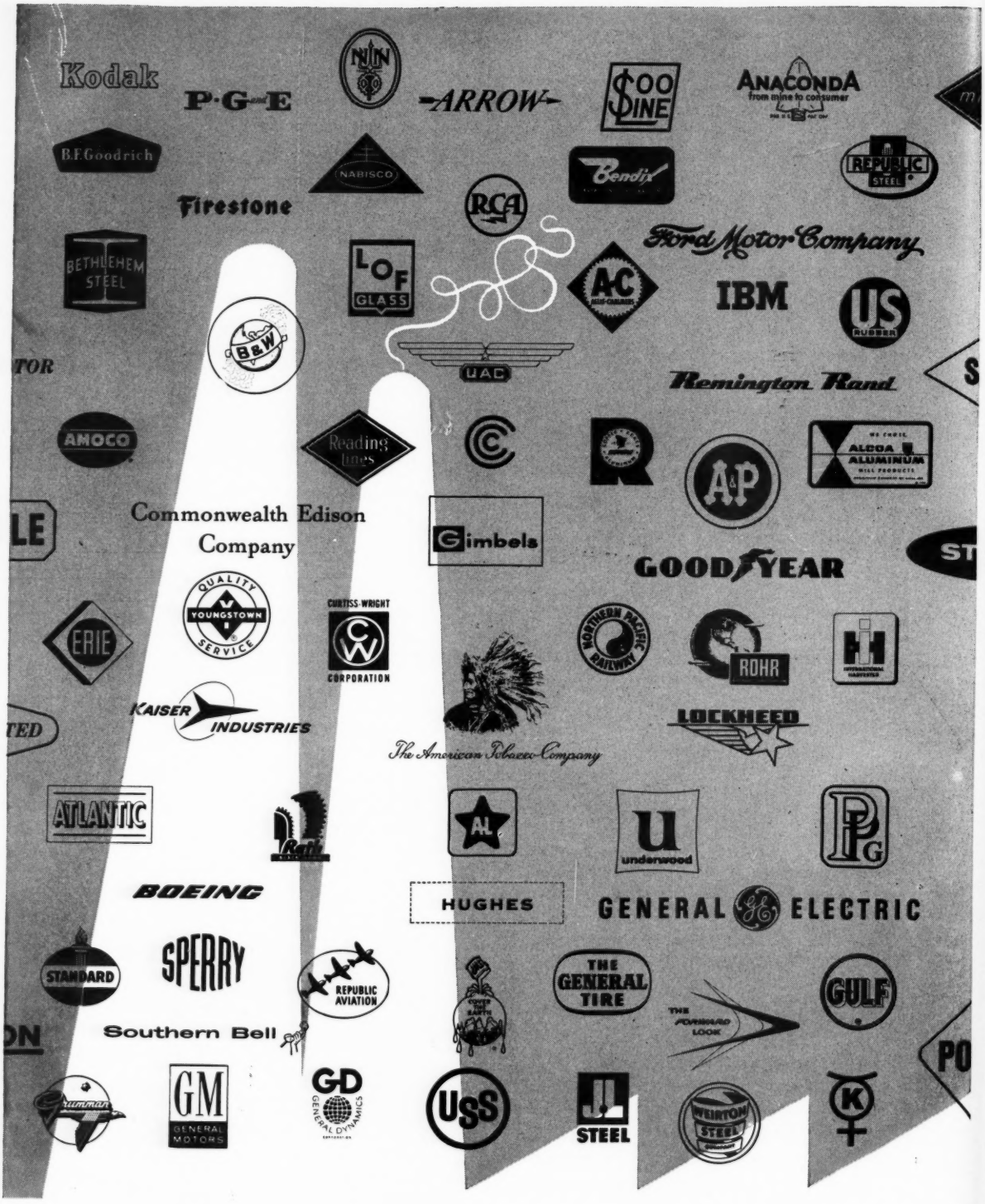
Traffic Engineering is intimately concerned with people. It is only natural, therefore, that our recipe for a convention should reflect this attitude in a well balanced social program. Here is an opportunity to reaffirm old friendships, and to make new ones. What better way is there for us to share in the activities of our associates in this far-flung field of Traffic Engineering?

Meat, potatoes, vegetables and dessert make a meal. These same ingredients, if served right, can also make a banquet. The 1959 Annual Meeting in New York will be just that. For example, this year's Technical Program provides a full day for Departmental Meetings. Three Departments will meet in the morning and three in the afternoon. This will offer you a better opportunity to take part in the discussions of your choice. Two other days will be devoted to committee activities and sessions of general interest to all.

To supplement the interesting and varied social program which is planned for you, are the myriad cultural and entertainment activities of our town only a few steps away from your Convention Headquarters at the Hotel Commodore.

We here in the New York Metropolitan area sincerely believe that the forthcoming Annual Meeting will be the biggest and best ever. We are looking forward with great pleasure to welcoming all of the membership and friends of the I.T.E. this coming September 14th.

WARREN S. QUIMBY
General Chairman
Local Arrangements Committee
29th Annual Meeting, ITE



LEADING AMERICAN INDUSTRIES

offer their employees the Payroll Savings Plan for U. S. Savings Bonds

These are but a few of the leading firms which support the Savings Bonds program with more payroll savers than ever before in peacetime.

Coordinating City Planning and Traffic Engineering

By Matthew C. Sielski
(Mem., ITE)
Director, Traffic Engineering and
Safety Department, Chicago Motor Club

A PROMINENT PLANNER has defined the traffic engineer as "a repair man rather than a builder, a first aid traffic 'corpsman' rather than a surgeon." The traffic engineer, on the other hand, often thinks of a planner as starry-eyed with wild dreams of shattering the entire transportation system of a city by building wide open residential areas, decorated with beautiful landscaping and parks.

It is unfortunate that these two professions do not have a better understanding of each other's work for they both constitute important functions of our rapidly growing metropolitan areas. There is every reason for these two professions to eye each other suspiciously. The reason for this feeling may have been rooted many years ago when cities were striving to stay alive.

The period between 1900 and 1930 marked the rapid development of cities in America. Every city had a desire to become big. Unfortunately, so many mistakes were made in planning that it is taking us many years to overcome them. Added to this rapid development was the era of "The city beautiful" started by Daniel Burnham, the famous early city planner.

Another factor creating city problems was the automobile whose effects were first felt about 1930. It was a big factor in the development of suburban living. This outward movement contributed to the blight of once proud residential streets. The rise in automobile use added congestion problems to city officials. It is justifiable to conclude that this was the start of the traffic enginering profession — getting traffic out of the congested muddle. It is true that the traffic engineer had to improvise methods for moving traffic over arteries that were not designed for today's vehicular traffic. It is true that limited funds for street construction necessitated correcting situations by default rather than by planned control. He had to use his ingenuity to move traffic over a system of streets whose circulation was badly planned and neglected.

The city planner rose in prominence after the 1930's due to the rapid expansion of the city and the need for proper planning in order to cope with ever changing technological, recreational, social and economic conditions.

Blight, crime, poor zoning, all added to a diseased city destined to doom unless properly "hospitalized." This was the start of comprehensive city planning. This included the three basic programs—zoning, urban renewal, and broad capital improvements. In order to properly accomplish this, six professions must be cordinated—the engineer, sociologist, geographer, economist, public administrator, and architect. It becomes the part of the city planner to weave all of these professions into one program. This is indicated by the definition of comprehensive planning — *the establishment of policies and making of plans for the future of a city in a way that considers the inter-relationships of all the different activities (such as traffic engineering) which are a part of its function and growth.*

One of the important developments in city planning today is urban renewal — the elimination of slums or blighted areas. Much harm could be done if proper use is not made of the various mentioned professions. An outstanding example of this was a housing redevelopment in the city of Chicago. The slum area devastated included a major artery which was cut off. This unwise planning was destined to cause traffic problems because of the inability of parallel arteries to increase their present capacities. This major error in city planning has caused many redevelopment areas to reconsider their plans in such manner as to provide adequate facilities for traffic using thoroughfares designated for removal.

Obviously, traffic and highway planning must be cordinated with urban renewal planning if efficiency is expected.

The Two Professions are Compatible

As has been mentioned, traffic engineering is a *part* of city planning. The planner, in developing a comprehensive plan for the city, considers the integration of traffic engineering with other necessary factors for a sound plan. However, traffic engineering is only one aspect of bringing a city back to a healthy condition. In a comprehensive plan for rebuilding a city, three basic programs are necessary: (1) zoning, which is basically the proper use of land; (2) urban renewal, which is the process by which a community eliminates blight or slums; (3) capital improvement programs, included in which is traffic engineering. Since each of these broad programs require both coordination and skilled professionals in the fields of economics, housing, engineering, land appraisal, etc., it is apparent that anything short of this procedure will lead to confusion and misuse of public funds.

Importance of Traffic Engineering

Since this profession is allied with the development of the highway program, its function is to develop sound circulation of transportation facilities —transit, commercial, private passenger, buses, etc. It should be apparent to city planners that certain techniques need to be applied in order to move people and goods both efficiently and economically. It should be apparent

that the development of a major arterial system or expressway, as undesirable as it may seem from the standpoint of land required, will have definite advantages for proper city development. The diversion of vehicles from many less important routes to several large arteries will enable redevelopment areas to build cul de sacs or any other type of development that the planner feels will retain the character of a desirable residential area but easily accessible to main thoroughfares.

This would enable planners to rebuild the structure of a city whose streets served an entirely different function than those of today. This type of redevelopment is of interest to traffic engineers because of the efficiency and safety in which traffic can be handled.

The application of traffic engineering principles to existing roads, though they may be regarded as "first-aid" methods, nevertheless shall continue to play an important part in the movement of traffic. Experience over the years has demonstrated that wide thoroughfares and expressways will not solve the problem of proper circulation. Since the majority of vehicles will continue to use the local street system, regardless of any comprehensive city plan, it is only fitting that modern traffic engineering principles be applied. There is nothing "first-aid" about using a street to its maximum efficiency. Channelization, rush hour parking controls, reversible lanes, coordinated signal systems, parking facilities—all are important applications which will continue to exist regardless of the scheme a city planner may make for the future city. Basic social habits in this nation have changed since the increased use of the automobile. This process is continuing to increase; along with this is the need for traffic control. The future will necessitate more and more traffic engineering service and consequently, emphasis should continue to be placed upon the need of this function.

Importance of City Planning

Equally important is the need for more qualified city planners — individuals who recognize the functions of a good over-all city plan. The city of today, in order to survive, requires the services of competent planners. Time has caused many problems to exist among which are the following:

1. Inferior zoning laws. This is an area in which much work is being done — the provision of adequate use of every parcel of land. To do this, the planner needs the advice of competent land use experts.
2. Slums and blighted areas.
3. Lack of proper recreational facilities.
4. Improper transportation facilities.

The job of the planner is to obtain the services of experts in various fields in order to develop a sound plan.

How Traffic Engineers Can Help

An outstanding example of cooperation of city planners with traffic engineers is the Traffic Advisory Committee of the Chicago Plan Commission. This committee is composed of traffic engineers of various highway agencies who act as consultants on street traffic matters to the Plan Commission. Before the Plan Commission embarks upon any projects such as housing developments, industrial districts, land clearance, it presents traffic plans to the Advisory Committee for their approval. This is an excellent example of teamwork of these two professions.

Conclusions

Urbanization of most cities is presenting many challenging problems. The solution to these problems will require vast sums of public money. The agencies responsible for doing this work will combine the talents of many professions — engineers, architects, economists, geographers, public administrators, and sociologists. Each has its own viewpoint and ability. It becomes the part of the city planner to weave all these professions into one city plan. It cuts across all of these activities and the city planner has the job of disciplining these into a comprehensive plan. Excellent opportunities exist for the future of both the traffic engineer and the city planner, for they will play important roles in the reshaping of our cities through urban renewal process, the highway program, and through the proper planning. It will require much understanding and cooperation between the two professions.

Training Opportunities

June 6-13—DATA PROCESSING IN HIGHWAY AND TRAFFIC ENGINEERING —
This course is designed for technical administrators in city and state highway agencies. Material will cover both selection and operation of data processing equipment. The course will be held at the Lake Arrowhead Conference Center of the University of California. Tuition (including board and room), $150. For further information, write to Course Director, ITTE, University of California, Los Angeles 24, California.

June 8 - 19 — TRAFFIC ENGINEERING AND POLICE ENFORCEMENT COURSE—
This course is an annual one offered by the Ontario Traffic Conference, and is scheduled this year at Huron College, University of Western Ontario, London, Ontario, Canada.

June 18-20—FREEWAY OPERATIONS SEMINAR
A seminar will be held at the Eugene Hotel, Eugene, Oregon under the sponsorship of the Western Section. Planners, traffic engineers, design engineers, enforcement officials, and others having official responsibility for freeways (planning, design or operations) are invited. For reservation forms and other information, address F. B. Crandall, Traffic Engineer, Oregon State Highway Department, Salem, Oregon.

JUNE 22-24—FREEWAY OPERATIONS SEMINAR
A seminar will be held on the campus of the University of California at Santa Barbara, California under the sponsorship of the Western Section. Planners, designers, traffic engineers, enforcement officials and others having responsibilities for freeway planning, design and operations are invited. For reservation forms and other information, address John W. McDonald, Auto Club of Southern California, Box 2890, Los Angeles 54, California.

CAN YOU HELP?

- **The Traffic Institute of Northwestern University is highly desirous of obtaining an out-of-print publication on police training.**
- **It is entitled "Survey of Police Training." It was issued in 1937 as a report of the Regents Examining Committee of the University of Minnesota.**
- **If you have a copy of this booklet and are willing to donate or sell it to the Traffic Institute for use in its police training program, address: Librarian, The Traffic Institute, Northwestern University, 1804 Hinman Ave., Evanston, Illinois.**

Sign Standards for the Interstate Highway System

By William G. Eliot, 3d
(Assoc. Mem., ITE)
Highway Transport Engineer
U. S. Bureau of Public Roads
Washington, D.C.

Based on a talk at the annual Traffic Engineering Conference at the University of Illinois, February 26, 1959.

THE National System of Interstate Highways promises us, within a few years, a network of modern controlled-access highways that will cover the nation—41,000 miles without a "stoplight," a stop sign, or, it is hoped, any serious traffic jams.

To a large extent, traffic control is inherent in the design of these expressways, and the need for traffic-control devices will be reduced to a minimum. Some few warning and regulatory signs will still find application, but they will be relatively rare. On the other hand, the very freedom of action provided by these highways makes all the more important those controls that remain. The emphasis shifts from regulation to guidance, but the need is no less urgent.

It is axiomatic that in our mobile world-on-wheels traffic-control devices must be uniform, regardless of State lines or city limits. Since, in these plural United States, it is an accepted governmental principle that traffic regulation is a State responsibility, our uniformity must depend on cooperation at the State level. For many years this cooperation has worked, on the whole, rather well. Tourists have not had much difficulty in finding their way around in safety. For the interstate system, however, on which no compromise in safety can be tolerated, complete uniformity is to be achieved by invoking a paragraph of the Federal-Aid Highway Act of 1944, which requires that all traffic-control devices on new Federal-aid highways shall be approved by the State highway department with the concurrence of the Bureau of Public Roads. The American Association of State Highway Officials has adopted a Manual for Signing and Pavement Marking of the National System of Interstate and Defense Highways, the Bureau has approved it, and it is the announced policy of the Bureau that all signs and markings on the interstate system shall conform to it without deviation.

Fortunately the interstate system, in its elements, was not altogether new. Our State highway departments, and particularly our toll-road authorities, had already accumulated a very considerable body of experience on high-type expressways. As early as 1956 the National Joint Committee on Uniform Traffic Control Devices, anticipating the needs of the interstate system, had begun drafting an extensive addition to the standard Manual on Uniform Traffic Control Devices, to cover "expressway signs." Soon after, the American Association of State Highway Officials independently set up a subcommittee of its Traffic Committee for the specific purpose of standardizing signs and markings on the interstate system. The preliminary draft of the Joint Committee's proposed expressway standards was circulated to the States, with a questionnaire, by the Association subcommittee and, it is believed, had a significant influence on the subsequent recommendations.

The Association subcommittee, with a number of invited advisors, drafted its recommendations in June 1957. These were subsequently referred to a special subcommittee of the AASHO Executive Committee, (consisting of the President and Executive Secretary of the Association and the Federal Highway Administrator) for completion, with particular attention to the achievement of even greater uniformity through the elimination of alternatives and generalities. After some special research and another questionnaire to the States, the final draft of the interstate sign manual was ready in January 1958 for letter ballot. Having received a better than two-thirds favorable vote it was declared adopted on February 10, and on February 21 it was approved by the Federal Highway Administrator.

It was generally agreed, from the beginning, that such few regulatory and warning signs as would be needed would be essentially like those that had long been standardized in the old Manual on Uniform Traffic Control Devices, only larger, as required for greater legibility. There would, of course, be some new messages necessitated by new elements of design, and there would be some decisions to be reached as to the applications of such signs.

The major problems, therefore, in the development of the interstate signing standards, concerned the design and application of guide signs.

Compared with legend and placement of guide signs, such matters as lettering, colors, reflectorization, and even panel size are perhaps to be regarded as secondary. Actually none of these elements, within wide limits, is as important as the messages that are to be conveyed. Nevertheless, they came in for a large share of attention.

The use of lower-case lettering, for example, has had many advocates. It has long been used on highway signs in Europe, and more recently it has been a distinctive characteristic of numerous freeways and toll roads. Evi-

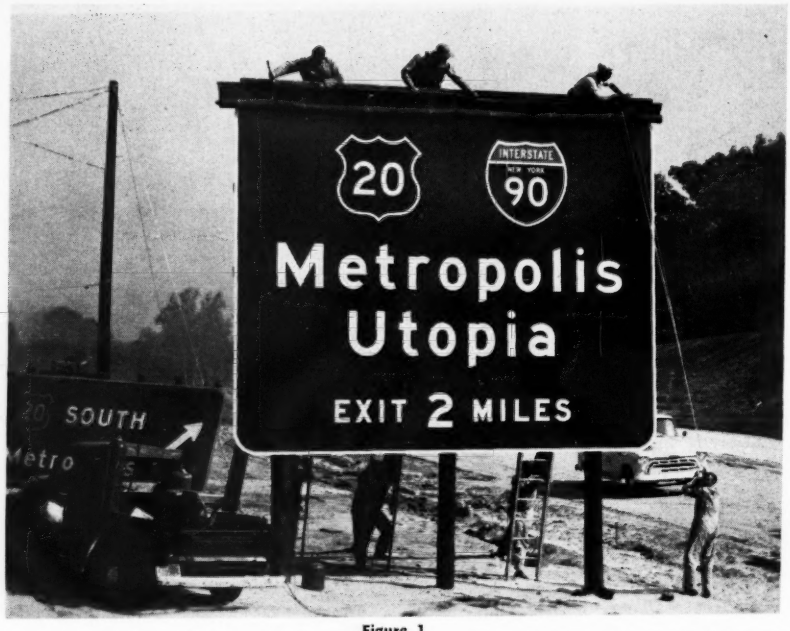


Figure 1
One of the experimental signs during erection, showing workmen adjusting the fabric used to cover the sign when a nearby sign was to be observed.

dence as to its efficiency in the utilization of sign area is not altogether conclusive. There is considerable evidence that lower-case letters are more easily read by the average reader. In any case, they add a certain character and distinction to a sign, and it seemed natural to adopt them for use on the interstate guide signs, though their application was arbitrarily limited to destination names. A lower-case alphabet originally developed by the California Division of Highways and slightly modified by certain manufacturers of detachable letters, was approved for use, and drawings have been made available by the Bureau of Public Roads.

For colors and reflectorization there were more serious differences of opinion. A prevailing trend toward green backgrounds for expressway directional signs, with a competitive desire for blue in some quarters, and a strong preference for black on the part of certain leading authorities, seemed to indicate a need for research. Almost at the last minute, therefore, the Bureau of Public Roads was asked to conduct a special series of visibility and legibility tests on variations of some of the proposed directional signs, with paticular reference to colors and reflectorization. A series of full-size signs was erected on a stretch of new, but still unused, highway near Washington, D.C., and viewed by more than 200 volunteer observers riding past in motor vehicles. The observers' reactions as to visibility distances, legibility distances, and color preferences were recorded. (See Figures 1 and 2.)

Figure 2
An experimental overhead sign. The shield, shown here in the center, normally covered either the right half or the left half of the sign.

All lettering and symbols were in reflectorized white, with regard to which there had never been any question. Three background colors were used, black, blue, and green, the last two being in both reflectorized and non-reflectorized finishes. To include all combinations of these variables there were five large roadside signs, differing only in color and reflectorization, and (omitting black) four overhead signs, also of identical design.

It was apparent from the tests that any one of the colors would have made a good sign. No one color scheme was outstanding under every condition of weather and illumination. The generally good showing of green, however, combined with a rather strong expression of subjective preference for that color, gave substantial support for the final selection of green as the approved standard. The available sight distances were not sufficient to demonstrate any clear advantage for a reflectorized background in terms of visibility or recognition distance, though it was obvious that any dark color that was not reflectorized or illuminated would appear essentially black at night.

The lower-case lettering for destination names, previously agreed to, proved to be legible, and was liked by the observers. Although the signs seemed enormously large on a relatively short stretch of empty road, the legibility distances for the lettering used indicated the need for just such large signs on high-speed expressways. The roadside signs, measuring 20 x 16 feet, showed destination names in 18-inch lower-case letters, with 24-inch initial capitals, while the overhead signs, 16 by 8 feet, used 12-inch lower-case, with capitals to correspond.

The report on these tests, circulated

to all the State highway departments, was doubtless influential in the final decision favoring green backgrounds. On the other hand, the generally excellent legibility of all the signs was not decisive with regard to reflectorization, and in the face of a fairly even division of opinion among the State highway departments, could not justify an arbitrary specification. The approved interstate standards, accordingly, permit the use of either reflectorized or nonreflectorized backgrounds for roadside signs, though for overhead signs they require reflectorization or illumination.

In a brief account it is not possible to review the interstate manual in any considerable detail. The principal feature is, as has been indicated, the attention given to directional signs. At and in advance of a major interchange there are to be two large signs, at two miles and at one mile, indicating the route or routes intersected, the destination or destinations served, and the respective distances from these two signs to the interchange. (Figure 3.) If there is only a single exit ramp at the interchange, there will be a similar sign at the beginning of the deceleration lane, having a directional arrow instead of the distance legend. In the gore there will be a sign reading simply "Exit" with an arrow. (Figure 4.)

If there are two exit ramps, as at a conventional cloverleaf, the sign at the beginning of the first deceleration lane will show the cardinal direction of the route to be entered, and the destination served in that direction. At the gore there will be an overhead assembly consisting of (1) a sign over the exit ramp repeating the information given on the sign at the deceleration lane, (2) a sign over the adjacent through lane showing the corresponding information for the second exit ramp, with an arrow pointing downward to the lane below and (3) over the remaining through lane a sign "Thru Traffic" with a down-pointing arrow. (Figure 5.) In the second gore there will be a sign similar to that at the first exit ramp showing route, cardinal direction, and destination, with an arrow.

At less important interchanges, only one advance sign, of a somewhat smaller size, will suffice, and in urban areas a much simpler scheme is permitted.

Where interchanges are far apart, provision is made for showing the distance to the next interchange on a panel below the nearer of the advance exit signs. Provision is also made for "services" signs, though no rigid practice is prescribed at this time. Service signs and "rest area" signs are to have green painted letters on a reflectorized white background.

15'-0" x 11'-0"
(Variable)

Figure 3
Typical advance sign of the type located 2 miles and 1 mile away from the interchange.

Delineators, white or "crystal," are to be placed continuously along the right side of interstate roadways, at 200-foot spacings. Along ramps and deceleration and acceleration lanes amber delineators will be spaced at 100-foot intervals.

Figure 4
"Exit" sign located in the gore, as used in Ohio.

12'-0" x 9'-0"

Figure 5
Overhead sign used to mark the lane for "through" traffic.

A few words should probably be said at this point regarding the route marking of the interstate system. As we all know, a distinctive route marker has been adopted, in a patriotic red, white, and blue design. (Figure 6.) The interstate routes have been numbered in a manner similar to that of the older "U. S." system. By assigning numbers in increasing order from west to east and from south to north, and omitting certain intermediate numbers, there is no State in which the same number is assigned to both an interstate and a U. S. highway. Where there is an overlapping of two routes, dual marking is provided for.

The marking of routes in urban areas has presented some problems. It has been decided that where there are urban radial routes or spurs on the *interstate* network (other than urban extensions of the major route) these shall be numbered with three digits of which the first digit is prefixed to the major route number. Supplementary loops or circumferential routes will be similarly marked. Radial or spur routes will carry an odd-number prefix, and loop or circumferential routes an even-number prefix.

Where an interstate route bypasses a town or city, the connecting route, *not interstate*, may be marked with a special informational marker of the same shape as the interstate marker, but having white legend on a green background, the word "Business" in place of "Interstate," and the word "Loop" or "Spur," as the case may be, replacing the State name.

Now that the interstate standards have been formally approved for almost exactly a year, it can be said that they have, generally and on the whole, been well received. Changes can be made where experience indicates by which amendments may be made, and the Executive Committee of the American Association of State Highway Officials is setting up a special committee for considering revisions and for interpreting specifications that may not be clear. There have already been numerous specific criticisms, and some of these will certainly lead to clarifications and changes as soon as the machinery can get into gear.

Objection has been made, for example, to the use of the Yield sign on entering ramps. Many traffic engineers have questioned whether, in fact, it does not defeat the purpose of an acceleration lane, where a relatively high speed merging must be achieved. Some States now require a speed of 15 miles per hour where a Yield sign is in place.

Criticism has been directed also toward the prescribed pavement marking at interchange gores. The use of a barrier line between two lanes of traffic in the same direction seems inconsistent with longstanding practice. In some States it might make technical violators out of all drivers in the through traffic lane. We should be able to substitute some other distinctive striping without the "no-passing" symbolism. It has been further pointed out that the striping prescribed in the interstate manual simply will not fit a "tapered" acceleration or deceleration lane.

The "No Stopping on Pavement" regulatory sign may not be properly applicable on roadways with full-width paved shoulders.

The gore "Exit" sign, without route or destinational information has been objected to, on the ground that it sacrifices one last chance to reassure the driver as to where he is going. The offsetting argument, of course, is that if the driver has not already made up his mind, a more informative sign may only cause hesitation and danger.

It has been said that an upward-pointing arrow on the overhead gore sign can be dangerously confusing or misleading, where, for example, the ramp leads off in a downward direction.

Difficulty may be met in suitably reflectorizing the white background of services and rest area signs to avoid dazzle and impaired legibility. There have also been reports of difficulties in matching, with nonreflectorized materials, the green color card bound into the AASHO manual.

These and other problems have arisen, and more will develop with experience. It must be remembered that the objective has been to create a truly uniform standard of traffic control devices throughout the interstate system, and this has required certain arbitrary decisions. The machinery for adjustment is available, and must be used if we are to get the maximum benefit out of the interstate system.

Figure 6
The first route marker is bolted in place on Interstate Route No. 70 in Ohio.

Safety and Economic Aspects of Expressway Construction in Michigan

By Gerald Wm. Graves
Executive Director
Michigan Good Roads Federation

JUST A LITTLE over one year ago, the Michigan State Highway Department, announced an unprecedented 1¼ billion dollar five-year construction award program. Averaging an expenditure of 250 million dollars annually over the period, it is contemplated that the program will be financed by an estimated 550 million dollars in Federal Aid, 400 million dollars in bonds, with future gasoline and weight taxes as security, and 300 million dollars, the Department's share from the Motor Vehicle Highway Fund. The program calls for:

New construction or reconstruction of 2900 miles of highway.

Construction of a new expressway system of over 900 miles, connecting all major Michigan cities of 50,000 or more.

Construction of expressways from the southern border to the Mackinac Bridge and the Sault, from Detroit to Chicago, and from Detroit to Muskegon, connecting *but* bypassing all cities on the way.

Paving all remaining 800 miles of gravel roads on the State trunklines.

Carrying out 400 million dollars worth of urban area projects, including a stepped-up Detroit area expressway program.

This program calls for *more than twice* as many miles of four-lane, divided highways in five years as were constructed in Michigan since the creation of the Highway Department in 1905. As the Commissioner pointed out, the state-wide arterial system, when completed, will be within 30 miles of more than two-thirds of our people, almost 90 per cent of our industry, over 80 per cent of our farms, and all of our metropolitan counties, while its northern arm will reach into the heart of Michigan's vacation and tourist area.

A considerable amount of mileage (all on the Interstate System) is being constructed to planned access standards. This necessarily means the relocation of many miles of roads, because of the requirements of design standards of the United States Bureau of Public Roads, and the excessive cost of attempting to utilize some existing routes.

Here is a sincere attempt by highway administrators to alleviate congested conditions by rerouting highways to outlying areas, or bypassing municipalities. Yet, with all our billions of dollars of road needs, and traffic difficulties, the attempt brought cries of distress from local businessmen and civic organizations in many instances.

Highway Officials Handicapped

The lack of factual information and data depicting the economic and safety effects which bypasses and expressway-type highways would create, handicapped Michigan's highway officials in their attempt to satisfy *not only* themselves, but also their critics. As a result, the Michigan Good Roads Federation ordered a study eleven months ago to determine the economic effects, amongst other aspects, of such highways and bypasses. The Federation employed Dr. Frank Suggitt, head of the Department of Resource and Development of Michigan State University to direct the study.

A great deal of the preliminary reports are now on hand. This article is based upon these reports, plus the observations of other studies in Michigan and results of reports nation-wide.

It is possible to make a good case for limited access routes on the basis of safety factors alone. The completion of Michigan's planned, or controlled, access routes will save a base minimum *of one life*, annually, for *each* ten miles of the system. In a real sense, all other factors can be considered as "extra bonus."

Studies by the United States Bureau of Public Roads, of 108 thousand accidents on 2100 miles of highways, reveals that traffic accidents were *cut four-fold* on planned, or controlled, access routes as compared to conventional highways — where the highways had full control of access, accidents averaged 171 per one hundred million vehicle miles—where no access control existed, the accident rate was 408 per one hundred million vehicle miles. The death rate on fully controlled access roads was 2.8 per one hundred million vehicle miles, while on conventional routes the rate was 9.6.

A special study conducted in Michigan several years ago related the number of access points to the accident rate. The accident rate per year per one million vehicle miles was under 4 on sections of highway with no access; over 9 with a moderate number of access points; and 13½ where the density of access points was great.

Safety Benefits

The most recent comparison of traffic volume and accident frequency, and rates, in our state was presented to the Federation last November, by Dr. Frank W. Suggitt. The study provides the most complete comparison of "before and after" data, in which the "old route" is compared with the "new route" with complete access control.

The back data upon which the report is based was taken from traffic accident reports of the Michigan State Police, traffic volume data of the traffic division of the Michigan State Highway Department, and other reports. The State Police data was derived from their own records as well as that data supplied to them by local county sheriffs and

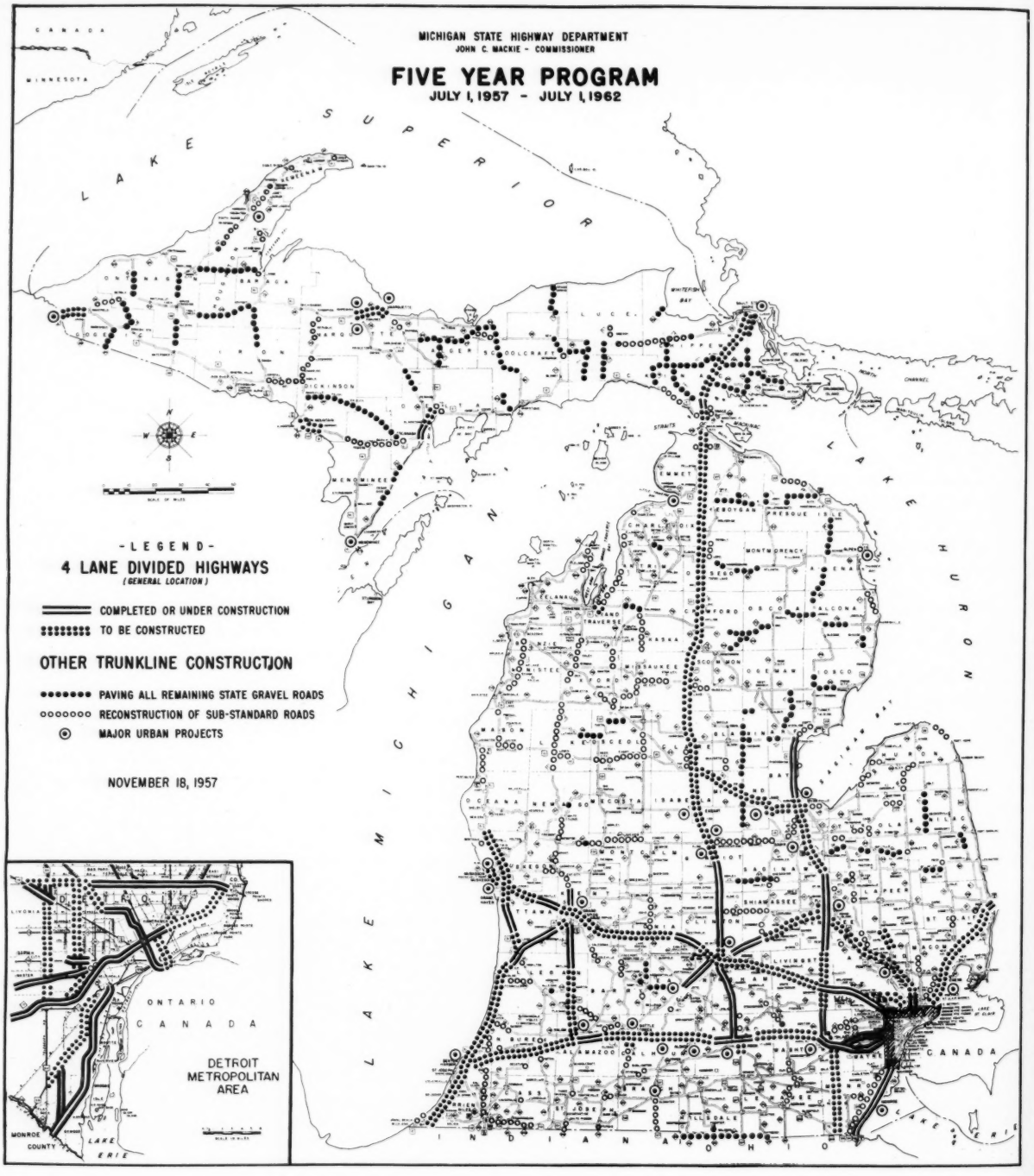


Figure 1

PRIORITIES FOR CONSTRUCTION—To avoid political favoritism and the pressures of local groups, the 5-year program will be constructed on a wholly scientific system of priorities. This system, developed within the Office of Planning of the Michigan State Highway Department, is exact in its determination of absolute needs based largely upon deficiency in highway capacity.

The priority system also emphasizes continuity in route construction rather than a haphazard dispersal of projects, and will result in early completion of necessary improvements on lines of major travel desire.

While the heaviest concentration of expenditures in the 5-year program is on expressway and other major routes, the priority system nevertheless provides for needed improvements on the lesser highways of the state. These improvements include widening and resurfacing, correction of dangerous vertical and horizontal alignment, and various stages of reconstruction where indicated. Also included is the improvement of gravel roads.

police departments. The traffic data is based upon actual traffic counts at established counting stations and extrapolation from that data.

To be included in the study, an expressway had to have been in operation at least 6 months, in order to acquire valid and comparable data. Six of the 11 sections studied were based upon a 6-month operational period and others were based on 12-month data. The outside time limits covered by the study were from July 10, 1955 to August 1, 1958.

The foregoing periods of study necessarily limited the mileage of operational controlled access routes that were considered to total 147.2 miles. The old route mileage totalled 161.6 for the "before expressway" period and 154.2 miles for the "after expressway" period.

The traffic carried by the old routes for the period prior to opening of the expressways was 14 per cent less than the combined traffic carried by the same routes after the opening of the expressways *plus* the traffic carried by the new expressways. In other words, 69,320,223 *more* vehicle miles were handled after the opening of the expressways in the *same traffic corridors*. The old routes themselves lost 244,395,248 vehicle miles during the period under study, while the new expressways carried 313,715,471 vehicle miles during the "after" period. The following is self-explanatory:

1. Old Routes "Before Expressway"	490,449,600
2. Old Routes "After Expressway"	246,054,352
3. New Expressways "After" Opening	313,715,471
Total "After" Traffic	559,769,823
Per cent increase in traffic served "after"	14%

The summary of accident records "before and after" the opening of expressways is tremendously significant (Table 1). In summary, the 147 miles of expressways enabled 14 per cent *more* traffic to be served. And, they *reduced* the number of fatal accidents by *more* than one-half—they *reduced* the fatality rate (per 100 million vehicle miles) by two-thirds—while the total number of accidents was *reduced* by more than one-quarter.

The 147 miles of expressways studied saved 25 lives. At a "low value" of 250,000 dollars per life, this amounts to more than 6 million dollars — *not* counting the price of the vehicles which would have been involved, and the family "heartaches" that come *with any loss of the human life.*

TABLE I

SUMMARY OF ACCIDENT RECORDS
"BEFORE AND AFTER OPENING OF EXPRESSWAYS"

(Expressway and old route "after" compared with old route "before")

69,320,223 more vehicle miles	14% increase
25 less traffic fatalities	60% decrease
15 less fatal accident	47% decrease
190 less accidents	16% decrease
4.8 less fatalities per 100 million vehicle miles	65% decrease
3.5 less fatal accidents per 100 million vehicle miles	54% decrease
65 less accidents per 100 million vehicle miles	26% decrease

Population Increases

Aside from the important safety factors, the programmed, planned access expressway system, and the others necessarily to follow, will have a more profound and generally beneficial effect upon Michigan's development than has any single force, or factor, in the state's history.

Michigan's population is growing rapidly and is expected to do so. It is increasing more rapidly than any of its neighboring states, and more rapidly than the population of the United States as a whole. The rate of growth and the total number of new Michigan citizens are considerably greater during the decade of the 1950's than during the period 1940-1950.

Only one other state, California, has experienced a greater rate of gain (percentage increase) and also a greater number of new people than has Michigan since 1950.

More than one-third of Michigan's population growth since 1950 has been due to migration. Migration has figured more strongly since 1950 than between 1940-50 when it accounted for 30 per cent of the population increase. The balance of the growth is due to an excess of births over deaths.

Improved employment opportunities are obviously the basis for Michigan's relatively rapid population growth. Increased establishment of manufacturing enterprises accounts for this, along with corresponding increases in associated services and professional occupations. Not only is Michigan a large and populous industrial state, *every indication points to more concentration of industry and people.* Michigan's expressway program will help to assure this.

The *U.S. News and World Report* predicts that by 1975 Michigan's population will increase from 7,500,000 persons to 10,700,000 persons, or an increase in the next 17 years of 42.1 per cent.

Dr. Suggitt predicts a *minimum population growth of 40 per cent* in the next 20 years in the 18 counties which now make up the "large urban counties." These counties, he reports, include Wayne, Oakland, Genessee, Saginaw, Bay, Macomb, St. Clair, Monroe, Lenawee, Washtenaw, Jackson, Ingham, Calhoun, Kalamazoo, Kent, Ottawa, Muskegon, and Berrien. Counties in close proximity, such as Lapeer, Livingston, Clinton, Eaton and Shiawassee will certainly share in the growth. The 18 large urban counties mentioned (each with a population of 80,000 or more) already contain 80 per cent of the state's residents and have accounted for 94.4 per cent of the state's total growth since 1950.

These counties are developing into "industrial corridors" and fortunately the present Five-year Construction Program is very well designed to directly service the economic needs of these areas and indirectly service their recreational needs.

Are these forecasts *unlikely* to develop? I doubt it! If anything, it will develop that the sights of the forecasters were not set high enough. We have consistently underestimated the growth of population and registrations of automobiles. In 1946, for example, the United States Census Bureau fore-

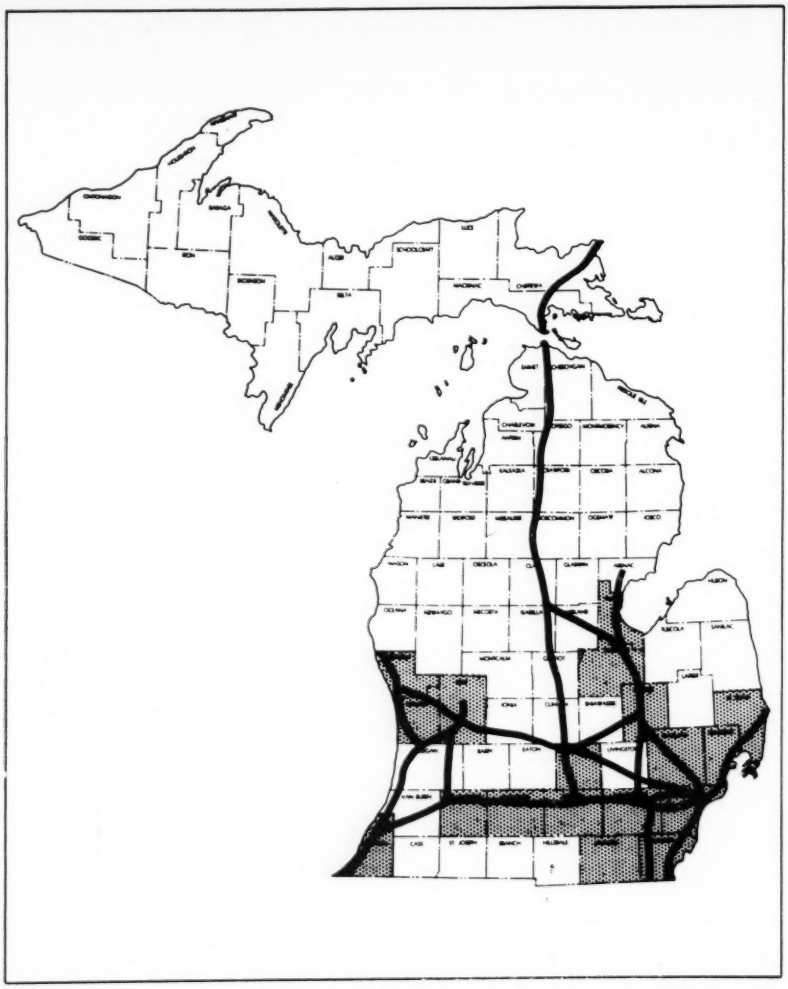


Figure 2

PROGRAM TO SERVICE POPULATION—The 18 large urban counties shown above (each with a population of 80,000 or more) contain 80 per cent of the state's residents and have accounted for 94.4 per cent of the state's total growth since 1950, according to the report of the Michigan Good Roads Federation. It reports that these 18 counties and those in close proximity, will experience a 40 per cent population growth by 1978. The expressway-type highways specified in the Five-Year Construction Program and present connecting routes, as shown, will greatly add to service these areas, it points out. A "corridor-type" growth of development along these routes and between these areas is most evident, it said.

cast a population of 150 million people in this country by 1955. Actually, there were nearly 167 million persons in the "good old U.S.A."—a forecasting error of 17 million people—more than the entire population of Canada!!

In 1946, automotive economists forecast 36 million cars on the road by 1955—the fact is that 52 million cars were registered by 1955. This forecasting error of 16 million cars represents more cars than are in all of Western Europe today!!

The continued rapid growth predictions are based upon Michigan's proximity to the largest—let me repeat—the largest consumer market on the North American Continent. The 35-million people in the region of Michigan, Wisconsin, Illinois, Indiana, Ohio and the Province of Ontario are among the world's most highly industrialized, most urban, and possess the highest standards of income and living *and are thus the most dependent upon automobile transportation.* The population growth in this region is almost exactly the same, in terms of numbers of new people, as that of the much-publicized Pacific Coast States.

Furthermore, Michigan's proximity to the natural resources upon which heavy industry is based adds to the bright prospects of growth. The iron ore and limestone of the Northern Lake States area are linked with the coal fields to the south and east by the Great Lakes and St. Lawrence Seaway, will further tend to concentrate industrial concentration in this area.

The abundant availability of fresh water for industrial processing, for human consumption, for waste removal, and for irrigation and recreation further assure Michigan's rapid growth.

The planned, or controlled, access highways are being constructed to meet the needs of today, and the challenge of tomorrow.

Distances Shrink Time-wise and Open New Areas

The system will shrink distances, time-wise, for local motorists, and out-of-state motorists, and will greatly speed up economic growth for the state. For all practical purposes the map of Michigan will shrink one-third to one-half its present size when it is better serviced by a continuous system of expressways. The planned, or controlled, access highways are being constructed to tie more closely together raw materials to manufacturing; farm and manufactured products to markets; and the huge population of Southern Michigan to the large recreational areas in Northern Michigan.

This will permit greater resort area penetration by out-of-state tourists and, in reverse, permit easier and more economical transportation of Michigan's products out-of-state.

Within the state, the system will open untold new locations for business, residential and manufacturing development in remote rural areas. Numerous examples of this are on hand, in other states, where planned, or controlled, access routes exist. In Boston, off Route 128, over 40 new plants and buildings worth at least 100 million dollars alone have gone up. A number of new "industrial centers" are now laid out. Developments along New York State's Thruway tell an inspiring story of economic growth, improved opportunities, and the meeting of traffic needs.

Dr. Suggitt reports that "vigorous real estate activity, speculation, and new land developments are all ready very much evident along every section of 147 miles of planned, or controlled, access highways studied, here in Michigan."

Michigan's announced five-year expressway construction program will, when completed, not only open up development in previously remote and inaccessible rural areas, but it will, in most cases, change surrounding, or adjacent, comparatively low priced properties into higher priced properties. The very few instances to date of

depressed values due to expressways are vastly overshadowed by other inflations of land values due to improved accessibility, time-wise, and convenience resulting from the expressways.

According to Dr. Suggitt's latest report, due to the lack of suitable space for new industry, residence and commercial centers in the congested and high land cost central cities, development is being forced to outlying areas. The "close in" suburban areas have too frequently been "blighted" by indiscriminate and unplanned development to the extent that here too there is not sufficient space available, or the unbalanced tax base is not suitable, for large-scale developments. Modern expressways pierce right through the shin-tangle of urban and suburban congestion and open up virgin areas for new development. The expressways follow new alignments and not the traditional horse and buggy routes, so there is a minimum of blighted condition along the new rights-of-way. By reducing travel time from one-half to one-third of that required on conventional roads and streets, expressways enable development in previously remote and inaccessible rural areas.

Modern industry, with its rambling ranch-type design, its campus-like landscaped grounds, and its need for acres of parking and terminal facilities, favors the rural location where land costs and tax rates are lower than in the downtown areas. There appears to be no let up in the trend toward spacious residential lots, and the increase in two-car families points to further decentralization of residential development. Where there are homes and jobs there is obviously a need for shopping centers and various business and professional services. *Expressways are merely accelerating and pin-pointing the trends* that have been with us for nearly 30 years.

The decision to locate a 5,000-employee automobile assembly plant and administrative offices in the Novi-Wixom area, 23 miles northwest from downtown Detroit, is an example of an industrial decision to relocate in an outlying area serviced by a new controlled access expressway. This decision has set into motion a wave of associated land developments that is drastically changing land use, land values, employment and commuting patterns, local government, taxes, schools and every other aspect of life in a 20-mile radius of the plant. Extensive interviews with plant officials reveal that all other factors considered, the proposed construction of U.S. 16 Expressway was the deciding factor in the decision to locate on a site fronting on the expressway. All other factors had to be satisfactory of course—but the *final decisive factor was the convenience and accessibility provided by the expressway*, according to authoritative company officials.

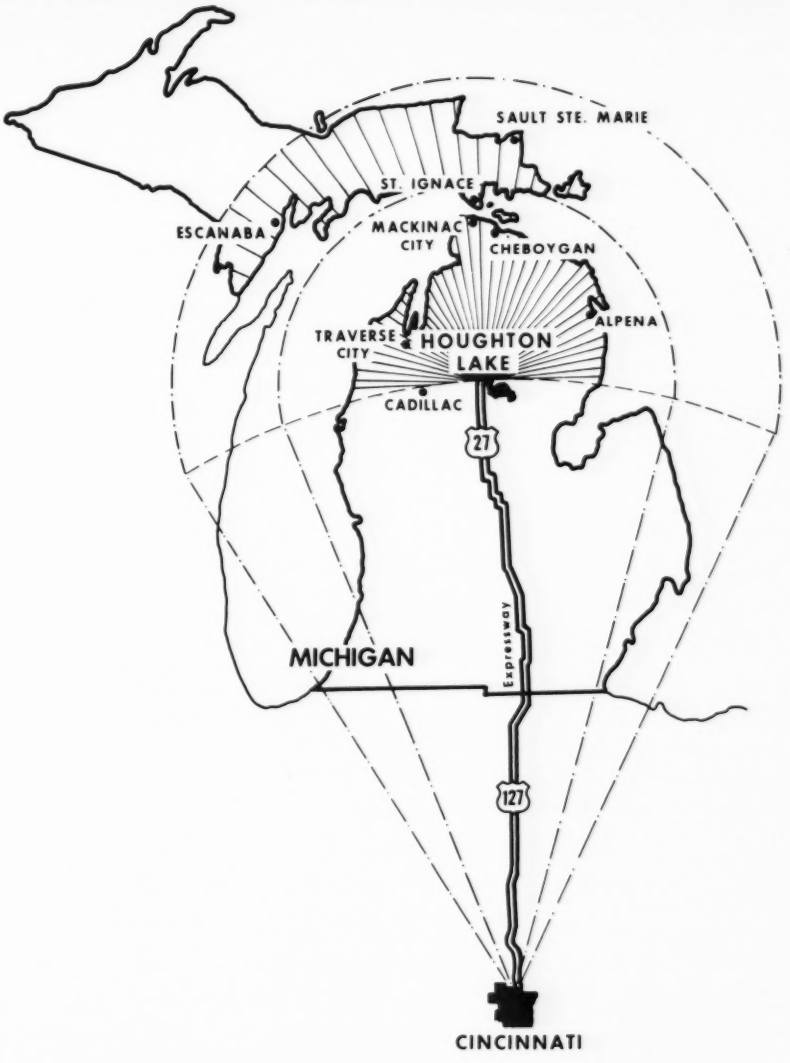


Figure 3

RESORT AND MARKET AREA TO EXPAND—The map above depicts the expanded resort area penetration which will result from the completion of an expressway-type highway from Michigan's southern border to Sault Ste. Marie, according to the report of the Michigan Good Roads Federation. Using the Cincinnati-Houghton Lake route as an example, the Federation points out that the expressway, and expressway connections to it, will permit out-of-state tourists from Cincinnati to travel into areas touched by the outer arc in the same "time-period" as present routes permit them to cover the distance to Houghton Lake. The expressway, with conventional connecting roads, will permit persons to travel to areas touched by the inner arc in the same "time-period" as present routes permit to cover the distance to Houghton Lake. As a result of this future time-distance change, the organization predicts a great increase in Michigan's tourist-resort business.

In the reverse of this example, the report points out that the time-distance change, resulting from the expressway, will provide a market area expansion to 5-million more people in Illinois, Kentucky and West Virginia, who will be as close "time-wise" as Cincinnati is today.

Although the plant is 28 miles from downtown Detroit and an equal distance from the nerve-center of the company, officials feel that expressway connections minimize the distance factor. The site of the plant occupies more than 300 acres of what was farmland three years ago. The buildings themselves occupy 1.5 million square feet, representing the second largest of this firm's assembly plants. Space is

provided for the parking of 3,600 employee cars and facilities are available to load or unload 24 motor trucks and 34 railroad cars simultaneously. Only in a remote rural location such as the Novi-Wixom area was open land available, at a satisfactory price and with reasonable taxes, for a development of this magnitude.

Land Values Increase

Before the auto plant was completed several associated industries moved onto adjacent pieces of property. Immediately north of the auto plant a 200-acre planned industrial subdivision is being developed. *Inflation in land values has virtually eliminated agricultural use of land in the vicinity.*

Directly across the expressway from the auto plant, fronting on the former trunkline route, a 700-acre tract is being developed as a self-sustaining, planned community for 7,200 residents. It is a forty-million-dollar residential development, perhaps the largest in the Detroit region, with 2,000 homes, an apartment complex, a shopping center, restaurant, motel and park and recreational facilities. According to the developers, this would have not been feasible had it not been for the expressways which will reduce the trip to downtown Detroit to a pleasant 30-minute drive when the urban expressway connections have been completed. Land values, on bare undeveloped land, increased about five-fold on this tract between the time the expressway was being surveyed and the time it was acquired for sub-division purposes. There will be another forty-fold increase in value within the next five years when the housing and commercial construction is completed—on this one tract. The sequence of change in land values goes like this: about $300 per acre as farmland before the expressway—about $1500 per acre as undeveloped subdivision land — about $57,000 an acre when the subdivision construction is completed.

Another representative case illustrating how land values increase along expressways is a 50-acre tract on U.S. 12 expressway which bypasses Ann Arbor just south of the city. The developer feels that immediate access to the Detroit-Chicago Expressway makes this a most desirable site. This is borne out by the fact that most of his one-acre lots have already been sold for $3,000 each, and the only improvement available in the subdivision was a graveled access road to the lots! At the time the area was observed, all but three tracts were still in alfalfa hay, yet most of them had been sold.

The average price paid by the Michigan State Highway Department for a 300-foot right of way for this 10-mile section of expressway was $1,524 per acre. This average price included the cost of houses that had to be acquired or moved and damages to property owners, as well as the cost of the land itself.

Significantly, the average price per acre paid for the right of way was only one-half the actual selling price of the industrial tract. The total selling price of the 50-acre industrial tract, $150,000 amounts to 25 per cent of the total cost of acquiring right of way for 10 miles of controlled access expressway which constitutes the Ann Arbor bypass of U.S. 12 expressway. Furthermore, "industrial land for sale" signs are in evidence, as are new factory developments all along this section of the expressway and along arterial county roads that interchange with it.

It is already evident that *the real increases in the value of land adjacent to expressways will represent a greater dollar value than the total cost of the expressways.*

Problems To Be Met

Michigan's programmed expressways will result in more rapid and more beneficial change to the state's people and enterprises than any other force has ever done in a comparable period of time. Some losses and dislocations will work to the disadvantage of a relatively few people—*but*, the gains will accrue to millions of people. Whole new centers of economic activity are vastly overshadowing the few who are regrettably suffering loss. At the same time, Michigan's competitive position for industrial and tourist development is being materially improved as a result of safe and efficient expressways.

With any growth, expansion or progress, however, come major problems. New volumes of traffic movement, changing traffic patterns, and new community development generated by the expressways, and already greatly underway here in Michigan, point to a definite need for continual study of expressway effects in order to improve the efficiency of planning and adjustment.

The generated new travel and traffic volumes, which are resulting here in Michigan, and which will continue to result because of the expressways, necessitate continuous revision of future needs and financing. They will place an added load upon highway, road, and street planning, programming, and construction.

Numerous beneficial changes are arriving, and arriving rapidly in Michigan and in other parts of the Nation—and with them problems. Each of us has a gigantic, challenging job ahead —the question remains, "Will we be ready for that challenge?"

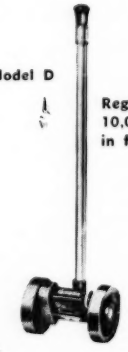
I sincerely hope the answer is "yes."

FOR MANY TRAFFIC ENGINEERING USES

THE...

Shalda MEASURE METER

Model D



Registers up to 10,000 ft. in feet & inches.

Direct Reading • No Bells • No Counting
No Computing • Fast Reset to Zero
Special for the TRAFFIC ENGINEER:
Graduated in either 10ths or 12ths

The Shalda Measure Meter has been put to practical use by traffic engineers all over the nation. Its simplicity and accuracy has proven tremendously valuable in traffic engineering and has been accepted as a useful and practical tool.

- Rust, dust, moisture resistant, sealed in mechanism.
- Light, weighs only 3 pounds.
- Extension handle to 40 inches.
- Finest precision counters.
- Trouble free, factory lubricated.
- Handy, portable—only 23 inches long.

FAST!! SIMPLE!! ACCURATE!!

Automatically adds or subtracts.
No other machine has this feature.

Just walk it ahead—the precision computer clocks off feet and inches like an automobile speedometer...with equally simple reading. To subtract—just back it up.

At only $42.50 will pay for itself many times over.

Distributed by

B. G. REILLY COMPANY

P. O. Box 231, N. Scituate, R. I.

— Dealer Inquiries Invited —

The FCC and Radio Control of Traffic Devices

By Joseph E. Keller
Dow, Lohnes and Albertson,
Washington, D.C.

This paper is adapted from a report presented by Mr. Keller at the International Municipal Signal Association meeting in Philadelphia, October 1958, and reported in more detail in *Municipal Signal Engineer*.

Since this was presented, IMSA, ITE and AASHO have joined forces through a small *ad hoc* committee to develop a petition to FCC along the lines suggested by the author.

RECENT ACTIONS of the Federal Communications Commission have had an effect on the availability of frequencies for traffic signal control. A brief discussion will perhaps outline some of the problems and suggest courses of action for the future.

The Federal Communications Commission has not, as yet, established any Service exclusively for traffic signal control but, rather, the frequencies available for this purpose are found among the allocations to several of the established Services at the Commission. Many feel that the development of radio traffic signal control would develop in a more orderly manner if specific frequencies were allocated for this purpose through the establishment of a new Service. This is certainly one of the matters which should be given serious consideration.

The Commission has recently announced that it will hold oral hearings in a fact finding inquiry designated Docket No. 11997 to commence early in 1959. The scope of this inquiry includes the possible reallocation of the entire 25- to 890-megacycle band. If some of the frequencies in this major portion of the usable spectrum could be developed to a greater extent than at present for traffic signal control, and if it can be demonstrated that such development would be enhanced in the public interest by a separate Service for this use, it might well be in the interest of the International Municipal Signal Association to urge that the Commission allocate certain frequencies or frequency bands to a new Traffic Signal Control Radio Service.

Of course, one of the most important matters to be decided in this regard is what frequencies or frequency bands should be requested. Since the use of radio for traffic light control is still in its early stages and is undergoing a continuing development, it would not appear wise to restrict the request to any particular band. Rather, it would seem more appropriate to request frequencies in several of the bands in the radio spectrum available for this use so that each of the particular frequencies, or frequency ranges, may continue to be used. At present, the frequency ranges available to control the flow of traffic are the 27 megacycle range; the 72-76 megacycle band; in some instances, frequencies in the 450-460 megacycle range and, of course, certain bands in the so-called "microwave" bands above 952 megacycles.

At this point, it would be well to review the availability of frequencies for traffic signal control in those bands which are presently open to this use and discuss recent Commission actions with regard to these bands where appropriate.

Under Part 10 of the Commission's Rules, until very recently only the frequency 27.255 megacycles was available for traffic signal control purposes. As a result of the Commission's recent action in Docket No. 11990, the Rules were amended to provide that the frequencies of 27.235, 27.245, 27.265, and 27.275, as well as the previous frequency of 27.255 may be used for any radio communication requirement of a licensee in the Public Safety Radio Services. This has, in effect, provided four additional frequencies which can be used for traffic signal control purposes. Of course, these frequencies are available for assignment in the Public Safety Radio Service for use only on a shared basis with stations in other Services. Also, the bandwidth of emission must not exceed 8 kilocycles and the power is limited to no more than 30 watts input to the final radio frequency stage.

The next band of interest is the 72-76 megacycle band which is available for "operational fixed" operations and thus can be used for traffic signal control purposes. However, the use of these frequencies is subject to the condition that no harmful interference will be caused to the reception of television stations on Channels 4 and 5. For this reason there has been no use of this band for traffic control. Furthermore, the Commission has not taken any action with respect to this frequency range in the "channel splitting" series of dockets considered during the past year.

Although operations in the 450-460 megacycle band have been placed on a "regular" basis and the channel spacing in this band has been reduced from 100 to 50 kilocycles, therefore making more frequencies available for use, unfortunately, in the Public Safety Radio Service none of these 450-460 megacycle frequencies have been made available for primary "operational fixed" use. However, base stations on frequencies in the 450-460 megacycle band in the Public Safety Radio Service can transmit to receivers at fixed locations on a secondary basis, provided that no harmful interference will be caused to base or mobile operations of any authorized station. In fact, a grant in the 453 megacycle band has recently been made to the City of New York in the new Local

Government Radio Service for base and mobile operations but with the provision that the base station transmitters can send tones to receivers at fixed locations to regulate traffic flow. Thus, although we cannot use the 450-460 megacycle band frequencies under Part 10 of the Rules on a primary basis for traffic signal control purposes, it is permissible to use them on a secondary basis and they are in fact being so used today.

Another source of frequencies for traffic signal control in the 450-460 megacycle band is, of course, the Citizens Radio Service. In its recent Report and Order in Docket No. 11994, the Commission made available 48 frequencies in the band from 462.55 megacycles to 466.45 megacycles for assignment to base, mobile, or fixed stations on a shared basis with other stations in the Citizens Radio Service. In addition, an additional 19 frequencies in the band from 460.05 to 460.95 were made available for fixed, base, or mobile stations on a shared basis with other stations in the Citizens Radio Service. Thus, by its action in this recent docket, the Commision has made available another large group of frequencies in the 450-460 megacycle bands for possible use by traffic signal control agencies. However, this use is on a shared basis with other stations and, for this reason, might not be desirable for traffic signal control use. This, of course, is another argument for urging the Commission to allocate frequencies to a special service on an exclusive basis.

The remaining bands available for traffic signal control use, of course, are in the so-called "microwave" portion of the spectrum, which, for practical purposes, commences at 952 megacycles. It is my understanding that there has been some development in the microwave portion of the spectrum and that at least two frequency groups are presently being used, or are being considered for use, for traffic signal control purposes; namely, these are the 952-962 megacycle band in Michigan and the frequency of 2455 megacycles in Baltimore and Philadelphia. Of course, since any band designated "operational fixed" could conceivably be used for traffic signal control purposes, there are many other bands in the microwave portion of the spectrum which could conceivably be utilized for this purpose. Thus, any action on the part of the Commission which would restrict the frequency bands available for operational fixed purposes is of concern. In this regard, during the past year, the Commission, on its own motion, reallocated several of the "operational fixed" bands to the Federal Government for its exclusive use.

In April 1958 the Commission released a series of doucuments whereby it immediately put into effect certain national frequency allocation changes and proposed certain others as well as some on the international level. The first document was a Memorandum Opinion and Order whereby the agency, by its own motion, and upon the request of the Office of Defense Mobilization, allocated certain non-government (operational fixed) use to exclusive Government use, and the reallocation of the 3500-3700 megacycle band from non-government to Government in amateur use on a non-interference basis.

Also, the 2450-2500 megacycle band, which is extensively used in the Public Safety Radio Service, and is specifically used for traffic signal control purposes, may now be shared by the Government Radio Positioning Service on a non-interference basis to non-government users. Finally, the 8400-8500 megacycle and the 13225-13250 megacycle bands have been reallocated from Government to non-government use for *fixed* and mobile operations.

In order to effect further changes in the national frequency allocations, the Commission also released a Notice of Proposed Rule Making in Docket No. 12404. As a result of the action by the Commission in its Memorandum Opinion and Order and Notice of Proposed Rule Making in Docket No. 12404 the possible future use of the 890-942 megacycle band and the 2500-3700 megacycle band for traffic signal control use has been lost, as well as the use of the 2110-2200 megacycle band for development of operational fixed use, including possible traffic signal control use, which will be limited to the extent that the common carrier fixed service occupies this band, respectively. The 2450-2500 megacycle band has already been affected to the extent that Government Radiopositioning operations may use this band on a non-interference basis, and if the proposals in Docket No. 12404 are adopted, non-government radiopositioning operations, which presently use the band on a non-interference basis will be able to utilize this band on a full sharing basis. Furthermore, the use of this band by non-government fixed and mobile stations is limited to remote control devices not intended for radio communication.

In compensation for the loss of these bands, two new bands, namely, the 8400-8500 megacycle and the 13225-13250 megacycle bands have been reallocated to non-government use for fixed and mobile operations.

There is one other possible source of frequencies for traffic signal control and that is through the use of subsidiary communications channels of FM stations. In this regard, the Commission recently issued a Notice of Inquiry requesting comments from interested parties on several issues concerning whether the Rules and Regulations should be revised to permit a wider scope of uses for subsidiary communication authorizations of FM stations. In its Notice the Commission stated that these uses run from price quotations for super markets, slow-scan video transmission of advertisements, and stock market reports to doctor's paging services and traffic signal control.

Of course, IMSA was interested in the proposals concerning the use of frequencies for traffic light control and filed comments in this Docket which was designated Docket No. 12517. In its comments, IMSA stated that it believed that in those cases where it would not be detrimental to the regular service of the FM station, and where the desired degree of reliability could be obtained, traffic signal control should be one of the subsidiary communications allowed.

In concluding, I hope that this brief review of the frequency availability situation for traffic signal control purposes has provided a clearer picture of the present situation and will stimulate some thought as to the best course of action to follow in obtaining sufficient frequencies and operating rules under which the orderly development of traffic signal control by radio can be accomplished. You know and I know that traffic signal control through the use of radio is a growing and dynamic innovation, but I feel that it will be necessary to convince the Commission of this.

Traffic News

Pittsburgh Area Transportation Study Now Well Along

To plan the kind of transportation system needed for the Pittsburgh metropolitan area, the State of Pennsylvania, the County of Allegheny, and the City of Pittsburgh, in cooperation with the U.S. Bureau of Public Roads, have established and financed the Pittsburgh Area Transportation Study.

Started in April, 1958, the Study will run for about two years under an appropriation of $1,000,000. The administrating Policy Committee consists of: J. L. Stinson, Division Engineer of the U.S. Bureau of Public Roads; R. F. Campbell, Deputy Secretary, Pennsylvania Department of Highways; P. J. Cusick, Director of the Pittsburgh Regional Planning Association (representing Allegheny County); and J. T. Mauro, Coordinator of Urban Redevelopment for the City of Pittsburgh. The supervising consultant is J. D. Carroll, Jr., and the acting study director is L. E. Keefer.

The purpose of the Study, which is patterned after those in Detroit and Chicago, is to inventory the present movement of persons within the Study area by all modes of travel except air and water, to project this movement into the future by relating it to the anticipated land use development, and to plan and recommend an optimum transportation system adequate to accommodate the future movement.

To fulfill this purpose the Study, located at 14 Wood Street in downtown Pittsburgh, was set up having seven operating 'divisions'—the home interview and truck-taxi; the roadside interview and traffic engineering; the land use inventory; the trip coding; the machine tabulating; the cartographic and design; and the office services. Each was staffed to accomplish its objectives within set time limitations.

The data collection stage has been completed. Principal tasks included the taking of home interviews at approximately 18,500 dwelling units within the 430-square-mile study area (see accompanying map) at a sample rate of 1 in 25; the taking of truck-taxi interviews for over 4,500 vehicles at a sample rate of 1 in 10; and the collection of 198,928 roadside interviews from 271,215 vehicles passing through 63 cordon line stations. Also involved was the field listing of detailed land use information for almost 12,000 blocks within the study area, including the City of Pittsburgh and 114 surrounding boroughs and townships. Included, too, was the taking of over 900 machine and 750 manual classification counts, and the traffic engineering inventory of about 800 miles of major streets in the area. Other information collected, or to be collected, includes the mass transit inventory data, the population and economic background facts, and much related information. At the peak period of interviewing, the Study had 180 employees; at present it has 55.

The data translation stage is now well along, with coding, key punching and accuracy checking scheduled for completion by June. The remaining months of the Study will be devoted to the analysis which leads to the planning and testing of the highway and transit systems needed.

PITTSBURGH AREA TRANSPORTATION STUDY

Liability for Inadequate Traffic Control Reported By Researcher

Should U. S. municipalities be held legally liable in cases where traffic regulation is inadequate?

Yes, says a legal researcher, to the extent that municipal officials responsible for traffic are found guilty of negligent acts of omissions.

The conclusion is presented in a thesis entitled "Municipal Tort Liability for Inadequate Traffic Regulation" by Patrick Herbst, of Berlin, Germany, whose investigation and research on this subject helped earn him a degree of Master of Laws from the University of California.

"It is hoped," says William L. Prosser, Dean of the University's Law School, in a foreword, "that Mr. Herbst's thesis will help to clarify at least one facet of the manifold tasks of the law in assuring highway traffic regulation consonant with, and worthy of, the technological progress in the 20th century."

Forty-four engineers with responsibilities in street and highway traffic attended a three-week Traffic Engineering Seminar held in March at Northwestern University with the cooperation of the Midwest Section of the Institute of Traffic Engineers. Shown above in the class picture are: First Row—(left to right) Jean M. Keneipp, NUTI (Course Director), ITE; George W. Barton, Consultant (Instructor), ITE; Harry Porter, Jr., National Safety Council (Instructor), ITE; Gerald O'Connell, NUTI; Louis C. Kisseleff, Denver, ITE; Richard D. Ciesla, Highland Park (Ill.); Marcel Jobin, Quebec Highway Dept.; Carlos D. Perez-Valentin, Puerto Rico Dept. of Public Works; Leland H. Bates, St. Louis; John G. Saunders, Ontario Dept. of Highways; Paul C. Thompson, Mankato (Minn.). Second Row—Raul A. Rodriguez-Russe, San Juan, Puerto Rico; John N. Kaye, Waterloo (Iowa); David R. Koski, Minneapolis; Robert W. Pederson, Minnesota Highway Dept.; Charles R. Miller, Jr., Chattanooga; Hans Kilz, Jr., Kansas City; James H. Vollstedt, Fond du Lac (Wisconsin); Robert B. Clary, Newton (Kansas); Fred W. Calhoun, Baton Rouge; Marcel Laliberte, Quebec Highway Dept.; Joseph W. Braun, Akron. Third Row—Miguel Nadal-Fremaint, Puerto Rico Dept. of Public Works; John L. Ayers, Virginia Dept. of Highways; Frederick W. Brabanski, D.C. Dept. of Highways & Traffic; Robert D. Owens, Minnesota Highway Dept.; Graham F. Shirra, Ogden (Utah); Myron C. Schwartz, Wisconsin State Highway Commission; Gerald R. Brown, Ontario Dept. of Highways, ITE; Lt. D. M. Foxworth, U. S. Army; Horace J. Stepp, High Point (N.C.); Walter B. Jennings, Leavenworth (Kansas). Fourth Row—Jack W. Anderson, Minnesota Highway Dept.; James B. Roberts, St. Joseph (Mo.); John J. Cardwell, Virginia Dept. of Highways; Frank J. Philopena, Connecticut Highway Department; Robert G. Holsinger, Des Moines; Ronald F. Draycott, Ontario Dept. of Highways; Gary E. Mathias, Council Bluffs (Iowa); Lowell R. Campbell, Winnipeg; Roland H. Fritsche, Milwaukee County (Wisc.); William E. Nell, Milwaukee. Fifth Row—Glenn V. Carmichael, NUTI; Jack A. Hutter, Consultant (Instructor), ITE; Victor G. Hofer, Consultant (Instructor), ITE; Michael A. Powills, Consultant (Instructor), ITE; Keith C. Frantz, Mason City (Iowa); Ralph R. Ryerson, Ohio Dept. of Highways; Joe C. Jennings, Consultant; Murray A. Main, Regina (Sask.); Martin J. Desmond, Hartford.

In January a Traffic Engineering Forum on Civil Defence was held at Arnprior, Ontario. Sponsored by the Canadian Governmet, the meeting was held to enable members of the Canadian Section of the Institute of Traffic Engineers to discuss CD problems, looking toward the formulation of Federal policies. Attending the Forum were: First Row—(left to right) Eric S. Wiley, Windsor, Ont., ITE; Roy D. Cowley, Toronto, Ont., ITE; H. R. Burton, Toronto, Ont., ITE; R. J. Desjardins, Toronto, Ont., ITE; J. J. Ward, Federal Government, Ottawa, Ont., CITE affiliate; J. R. Prior, Battle Creek, Mich.; J. A. Stewart, Victoria, B.C.; R. A. McKenzie, Winnipeg, Man. Second Row—E. J. M. Hughes, Federal Government, Toronto, Ont.; E. A. Horton, Toronto, Ont., CITE affiliate; J. A. Sharp, Winnipeg, Man., ITE; F. J. Sansom, Toronto, Ont., ITE; R. C. Boges, Vancouver, B.C.; D. J. Nevill, Regina, Sask.; A. Couture, Laval Des Rapides, Que.; W. A. Bryce, Ottawa, Ont., Can. Hwy. Safety Conference; M. Masson, Montreal, Que.; R. A. Draper, Ottawa, Ont., Can. Good Roads Assoc.; A. J. Scotti, Canadian Army, Ottawa, Ont. Third Row—W. E. McDermott, Federal Government, Ottawa, Ont.; D. D. Kuchinski, Edmonton, Alta., ITE; E. F. Gillies, London, Ont., ITE; L. Delisle, Montreal, Que.; J. R. Fiske, Halifax, N.S.; B. Huffman, Edmonton, Alta.; J. Morgan, London, Ont., CITE affiliate; R. F. Smith, Lethbridge, Alta.; G. N. Worsley, Victoria, B.C.; J. L. Forster, Toronto, Ont., ITE; M. T. M. Nielsen, Ottawa, Ont., ITE.

Because Mr. Herbst's review of present law and court decisions contains information of value and importance to municipal officials, the thesis has been published in pamphlet form by the Automotive Safety Foundation, 200 Ring Bldg., Washington 6, D.C. A very limited number of copies is available.

Marsh Studies Traffic Problems In England

Burton W. Marsh, director of the traffic engineering and safety department of the American Automobile Association, has returned from London after a four-week visit to study problems of traffic control and planning in England. Made at the request of the London *Daily Telegraph*, one of the larger newspapers, the trip was to allow Mr. Marsh to "make a reconnaissance of (England's) problems and plans." In due course, his conclusions will be reported.

The trip took Mr. Marsh to some of the main provincial cities as well as London, since the study was to be country-wide. Mr. Marsh has been careful to point out that he will not be suggesting solutions to specific problems but rather will offer comments that will advance the utilization of traffic engineering principles and explain the value of traffic engineering.

Many Highway Safety Proposals Introduced In Congress

Many bills have been introduced in Congress this year which deal with the subject of safety on our streets and highways. The proposed legislation covers many facets of the field including uniform traffic laws, design of motor vehicles, safety devices and equipment, the mechanical fitness of motor vehicles, driver training, and establishment of a clearing house on revoked driver licenses.

Uniform Traffic Laws

House Concurrent Resolution 21 introduced by Representative Multer (D., N.Y.) expresses the sense of Congress that traffic laws should be uniform throughout the United States.

Clearing House for Revoked Driver Licenses

The Secretary of Commerce would be required by two bills (H.R. 4946 and H.R. 5436) introduced by Representative Rhodes (R., Ariz.) to maintain a register of names, as reported to

California's Aluminum Construction Signs Can Take It!

Highway construction signs get a lot of punishment. That's why these new signs are fabricated of Alcoa® Aluminum. Despite jostling around on trucks, rough handling, hasty erection, weather—these rugged Alcoa signs can double and even triple message life. Aluminum's inherent corrosion resistance eliminates progressive deterioration and delamination, even if the surface should be pierced by flying stones or damaged by vandals. Lighter weight makes them easier to transport from one job site to another. These new Alcoa signs are available in any size and can be painted or faced with "Scotchlite"* reflective sheeting. Messages can be changed at will. For immediate details on how their long life saves you money, write direct to: Aluminum Company of America, 1707-E Alcoa Building, Pittsburgh 19, Pennsylvania.

*Trademark of Minnesota Mining and Mfg. Co.

Easy to see at all times . . . simple to erect . . . no maintenance ever required . . . that's why the California State Highways Department installs these new signs of Alcoa Aluminum *exclusively* wherever highway construction is in progress.

ALCOA ALUMINUM
ALUMINUM COMPANY OF AMERICA

Your Guide to the Best in Aluminum Value

For Exciting Drama Watch "Alcoa Theatre," Alternate Mondays, NBC-TV, and "Alcoa Presents," Every Tuesday, ABC-TV

him by states and political subdivisions, of individuals that have had their driver's license revoked or have been refused a license. States and subdivisions could then draw upon this information when necessary. H.R. 4946 also would impose penalties for operating a motor vehicle in interstate or foreign commerce without a valid permit.

Safety Design and Equipment

House Resolution 40, introduced by Representative Lane (D., Mass.), would direct the Committee on Interstate and Foreign Commerce to conduct a full study of the question of the extent to which travel in interstate commerce can be made safer through the adoption by manufacturers of the safest practicable designs and the incorporation of various safety devices presently available. Also, what action, if any, the Federal Government should take in this respect. A report to the present Congress would be required.

The Secretary of Commerce would be required under another bill (H.R. 722—Rep. Bennett, D., Fla.) to promulgate standards for "devices for use on motor vehicles designed to provide the public with the safest possible automobiles without unreasonably increasing automobile costs." Similar bills (H.R. 920 and H. R. 1341—Rep. Roberts, D., Ala.) would require such "reasonable safety devices," conforming to Commerce standards, to be installed by the manufacturer. The latter bill would apply only to passenger-carrying motor vehicles purchased by the Federal Government.

Representative Multer (D., N.Y.) has introduced four bills; (1) H.R. 880 — requires a manufacturer's certificate of fitness to accompany all motor vehicles sold or moved in commerce; (2) H.R. 881 — a comprehensive bill to regulate the fitness of a motor vehicle and accessories, and manufacturer-dealer relations; (3) H.R. 382—to prohibit the sale of motor vehicles with equipment, parts and accesories different from, or in addition to, those specified in current literature and advertisements; and (4) H.R. 883 —to require speedometers to be sealed to prevent tampering therewith.

Seat belts would be required to meet standards prescribed by the Secretary of Commerce according to two bills (H.R. 1057—Rep. Roberts, D., Ala.) and (S.291 — Sen. Humphrey, D., Minn.).

Driver Training Programs

Assistance to the states in providing driver training programs in school curriculums would be granted under a bill introduced by Rep. Roberts (H.R. 1058). The bill would authorize $28 million to be apportioned among the participating states.

Other Legislation

The Surgeon General would be required to conduct research and prescribe standards as to the amounts of unburned hydrocarbons and other noxious gases that would be safe, from the standpoint of human health, for a motor vehicle to discharge into the atmosphere according to two bills (H.R. 1297—Rep. McDonough, R., Calif.) and (H.R. 1346—Rep. Schenck, R., Ohio).

Another bill (H.R. 408—Rep. Roberts, D., Ala.) would require the Secretary of Commerce, acting through the National Bureau of Standards, to conduct research to determine (1) what products of combustion of various fuels are harmful to human health, and (2) the minimum concentrations in the atmosphere of such products which are harmful to humans exposed thereto. A report to Congress would be required as soon as possible.

The Postmaster General would be required to issue a postage stamp bearing the legend "Highway Courtesy is Contagious" under a bill (H.R. 639) introduced by Representative Saylor (R., Pa.).

Another bill (S. 130) introduced by Senator Capehart (R., Ind.) authorizes the President to issue medals of honor to persons performing heroic acts in preventing serious highway accidents, or in saving lives endangered as a result of any such accidents.

Mark this date on your calendar!

29th Annual Meeting

Institute of Traffic Engineers

Sept. 14-17, 1959

- **Hotel Commodore**
- **New York City**

D. Kenneth Chacey

Chacey Earns Army's Highest Civilian Award

D. Kenneth Chacey (Assoc. Mem., ITE) has been awarded the Department of the Army Exceptional Civilian Service Decoration by Secretary of the Army Wilber M. Brucker. The award is the highest made to civilian employees of the Army and is the fourth special award earned by Mr. Chacey in the past several years.

Mr. Chacey, who is Assistant Chief for Transportation Engineering on the staff of Major General F. S. Besson, Jr., U.S. Army Chief of Transportation, was cited among other things "for his extraordinary accomplishments, both in the public interest and for the Department of Defense, in matters pertaining to transportation engineering and in integrating the needs of national defense into the highway programs of the United States, both in system development and in the provision of access roads needed to support military installations and defense industries." His work has won him recognition as an authority on highway transportation requirements by cabinet officials, Members of Congress, and top Defense authorities. Mr. Chacey received the National Civil Service League's Merit Citation for 1958 "in recognition of an outstanding career in the public service." Previously, he had been awarded the Outstanding Employee Rating and the award for Sustained Superior Performance of Duty.

A veteran of 16 years of military and civilian service, Mr. Chacey joined the Highway Transport Division of the Office Chief of Transportation in November 1942 after receiving a direct commission as 1st Lieutenant. He

remained following World War II as a civilian employee and in 1950 was elevated to the position of Special Assistant for Transportation Engineering. He was named an Assistant Chief last month and assigned added responsibilities for safety, installations and transportability requirements.

A registered professional engineer and onetime Regional Traffic and Safety Engineer with the Ohio State Department of Highways, Mr. Chacey is a charter member of the National Society of Professional Engineers in addition to his membership in the Institute of Traffic Engineers. He holds a Reserve Commission as Colonel, Transportation Corps and serves as Deputy Commander of the 435th Highway Transport Command (Army Reserve) of Washington, D.C.

More Phone Service Provided on New Jersey Freeway

The Garden State Parkway in New Jersey has begun to look like a highway of telephones as its string of convenient calling centers has been stretched to serve motorists all along the 173-mile road.

Chairman Katharine E. White of the New Jersey Highway Authority reported that the latest additions in roadside telephone areas leave Parkway motorists with a total of 45 available sites and 130 booths from which to make enroute calls.

The Parkway is believed to be the first superhighway in the nation with such widespread telephone facilities for motorists' use. The average distance between public telephones on the Parkway is approximately six miles.

Some 15 roadside telephone areas have been added since the first of the year. There are now 34 such public phoning spots just off the right shoulder of the northbound and southbound roadways. The other 11 sites are in Parkway restaurants and service installations.

The demand for convenient telephones along the road is evidenced by the steadily increasing use of the public facilities from the time of the Parkway's opening. The first roadside telephones on the Parkway were installed in sections built by the State Highway Department.

Sixty-four or almost half the total number of public telephone booths on the Parkway are located in roadside areas. Five more roadside units are to be installed by this Summer.

Besides serving convenience, the telephones can be used to make contact with State Police headquarters on the Parkway in cases of emergency.

Western Parking Gate
in combination with hourly rated
"Parkontrol" Time-Dater-Imprinter Equipment.

Over 700 Western Parking Gates in more than 100 cities have proved that off-street parking can be handled automatically at a substantial profit. Positive control—Western Parking Gates are electrically operated to give complete flexibility, dependability and ease of operation in any city parking facility.

Key, electro-card, coin and token-operated gates, separately or in combination, provide the answer to municipal lots operated on a flat fee arrangement.

"Parkontrol" Time-Dater-Imprinter Equipment available for operations involving hourly rate and validation parking. Low labor costs, low initial equipment cost and simple installation make them a wise investment for any city.

EXCLUSIVE FEATURES—Western, builder of more than 12,000 railroad and highway crossing gates, has engineered the "Lot Full" sign, electric opening and closing treadles, double key controls for night and day parking, electro-cards with period changes, push-button remote controls and automatic counters.

WRITE TODAY for information on various parking lot control plans available for your application.

8376

WESTERN INDUSTRIES INC.
Electric Parking Gate Division
2746 West 36th Place, Chicago 32, Illinois
CANADA: Cameron, Grant Inc., 465 St. John Street, Montreal 1, Quebec

More Police Officers Will Reduce Accidents, Survey Shows

More patrolmen on the highway will reduce accidents but will have little effect on speeds of motorists.

These are the tentative conclusions of a research team of the Traffic Institute of Northwestern University, following a series of tests on four stretches of Wisconsin highways.

Findings of the two-year enforcement study are given in a recent (February) issue of the Institute's monthly *Traffic Digest & Review*, by Robert P. Shumate, associate director of research and development. Shumate headed the team that made the experiments, in cooperation with the Wisconsin State Patrol.

As to the effect of increased enforcement on accident frequency, the researchers found:

1. Addition of enforcement units (patrol vehicles) to a given stretch of highway reduces the frequency of fatal and personal-injury accidents if the miles traveled per patrol unit observed is 13 or less. When miles traveled per patrol unit observed reaches 26, the frequency of accident occurrence shows no significant change.

2. Property-damage accidents do not show as consistent reductions as fatal and personal-injury accidents. This *may* be attributed to the fact that property-damage accidents are more susceptible to changes in the completeness with which they are reported.

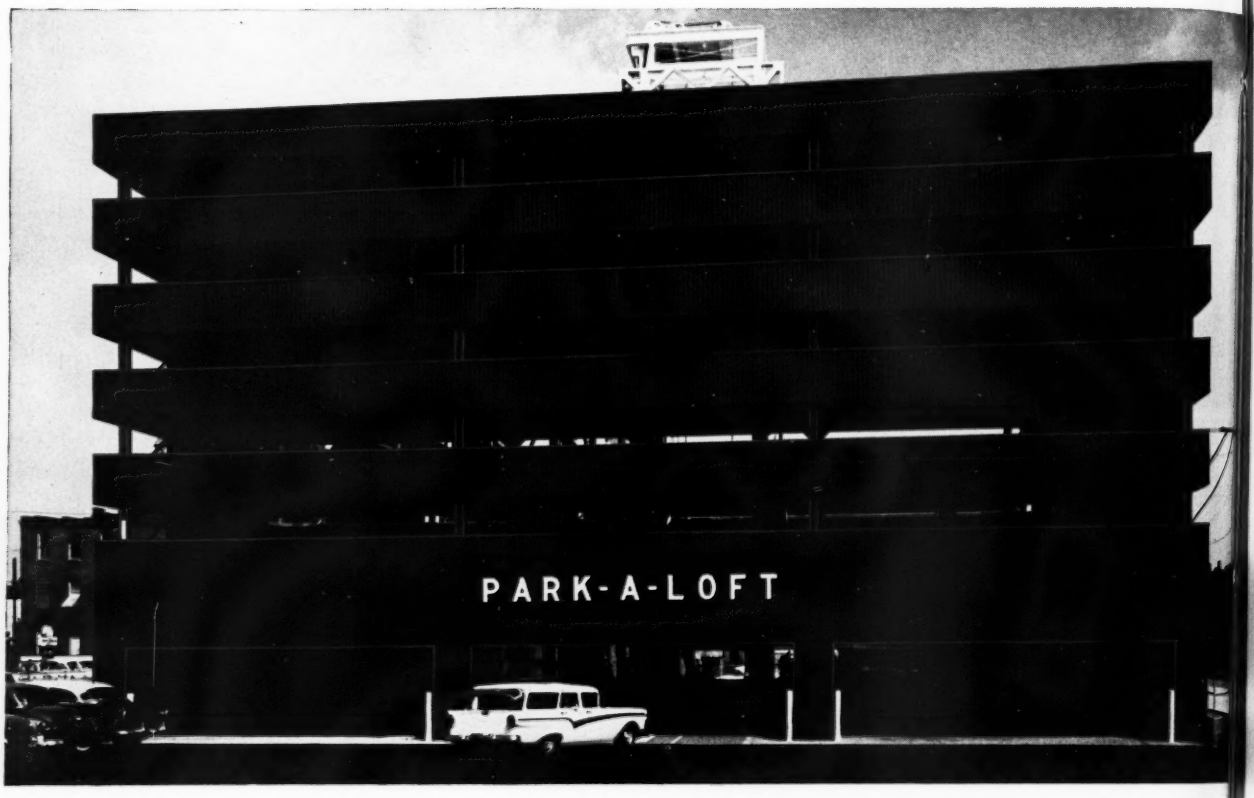
3. *One* measure of patrol effectiveness is the average frequency with which motorists traveling a section of highway pass a patrol unit.

As to the effect of enforcement on vehicle speeds, significant findings were:

1. The per cent of vehicles traveling in excess of the legal speed limit did not show any decrease which could be attributed to the increase in enforcement units.

(Continued on page 36)

Park-A-Loft®...



New 264-car Park-A-Loft at Parkersburg, West Va. Frank W. Gove, Jr., Mayor and Chairman of Parking Commission; Jesse D. Folwell, architect; Wilbur Smith & Associates, consulting engineers; Dresser-Ideco Company (Division of Dresser Industries, Inc.), general contractors.

everything that's new in a mechanical parking garage

For the first time, a mechanical parking garage that produces first-floor income, takes traffic surges right off the street

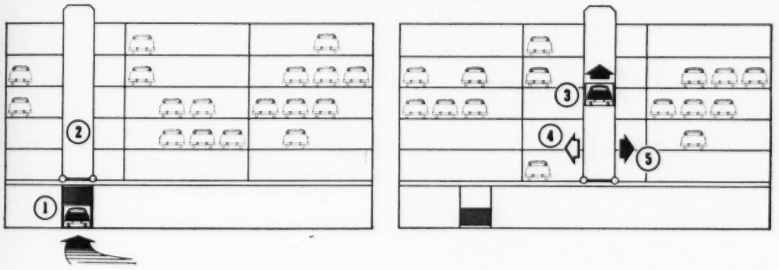
Practically the entire first floor of this Dresser-Ideco "Park-A-Loft" garage in Parkersburg, West Va., produces income. This usable first-floor area is one of the compelling reasons why you should investigate Park-A-Loft. Floor for floor, Park-A-Loft has an unmatched capacity for high-density parking, so essential for efficient use of high-cost, restricted down-town lots. No other mechanical garage has anything like Park-A-Loft's ability to handle traffic surges.

This efficient use of first-floor space comes from Park-A-Loft's unique overhead tower-elevator system. It rides on rails at the second floor level, clears the ground floor of space-wasting elevator travelways. In addition, this two-dimensional tower elevator system saves car handling time. As the elevator carrying a car moves up, the tower *simultaneously* moves horizontally, transporting the car to a previously selected parking stall. This compound movement assures fast handling of vehicles, permits high rate of turnover with minimum crew.

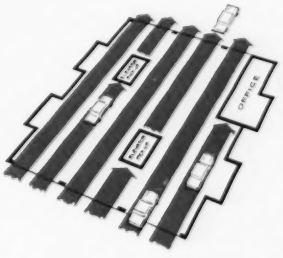
But that's not all that is new and exclusive in Park-A-Loft. Each car dolly *automatically adjusts to correct length* for the car being handled, regardless of make or model.

The features of Dresser-Ideco's Park-A-Loft mechanical garage are so new, so important, it will pay you to become familiar with them all. Let us show you our color, sound movie of actual parking operations at the Parkersburg installation. And write for the new Park-A-Loft folder. There's no obligation. Just send your request to Richard Haas, manager Garage Division.

No other mechanical parking garage operates like this . . . or gives this bonus first-floor space.



Park-A-Loft does 2 things at once (left) Car stops in front of elevator station on first floor (1), elevator tower (2) is in position overhead and elevator is on ground floor. Dolly picks up car, carries it onto elevator. (right) As elevator rises into tower (3), wheel-mounted tower **simultaneously** travels either left (4), or right (5) along face of the parking stalls. As tower travels, elevator within tower rises to selected level. At desired parking stall, elevator and tower stop; Park-A-Loft dolly carries car into stall and deposits it. Entire sequence of operations takes only seconds. De-parking operations are just the reverse.



Unmatched reservoir space. Only Park-A-Loft gives you this clear, usable first floor area. Cars can be driven completely through to adjacent parking area, or parked immediately without waiting for mechanical operations.

(left) **No hands.** Car dolly automatically adjusts to the correct length for the car being handled . . . lifts every make and model on rubber-covered pads at these 3 safe points — under both sides of front suspension frame and under differential. There's no metal-to-metal or metal-to-tire contact, no chance of operator error.

(right) **Easiest, safest way to park.** Dolly deposits cars in parking stalls. Right front wheel lock stops any movement. No space is wasted, there's no chance of damage to vehicles.

Dresser-Ideco Company

DIVISION OF DRESSER INDUSTRIES, INC.

PARK-A-LOFT DIVISION, DEPT. P-97, 875 MICHIGAN AVE., COLUMBUS 8, OHIO

DRESSER IDECO

New Appointments

Musick Named State Traffic Engineer for Ohio

James V. Musick (Assoc. Mem., ITE), former traffic engineer for the City of Columbus, has been appointed

traffic engineer for the State of Ohio. His new title is Engineer, Bureau of Traffic, Ohio Department of Highways.

Mr. Musick, who has served in Columbus since 1954, had also worked in the Cincinnati Traffic Engineering Division and spent two years as a traffic engineer with the U. S. Air Force Air Materiel Command. In Columbus he was in charge of the installation and maintenance of a $700,000 traffic signal master control system which has attracted much national attention.

Mr. Musick is a graduate of the University of Illinois in civil engineering, and completed the Yale Bureau of Highway Traffic course in June 1951. He is a registered professional engineer in Ohio, and has been active in Ohio Section activities of the Institute of Traffic Engineers, serving as an officer for the past two years.

Fred C. Tarbox (Mem., ITE), who was serving in a temporary capacity as traffic engineer following the death last year of Harold Eckhardt, is continuing with the Ohio Department of Highways but not in the Bureau of Traffic.

Johnston Named Traffic Engineer for Utah State Road Commisison

J. Edward Johnston, (Mem., ITE) has been named traffic engineer for the Utah State Road Commission, a position he will assume on June 1. In this new position, he will be in charge of all traffic and planning activities for the department.

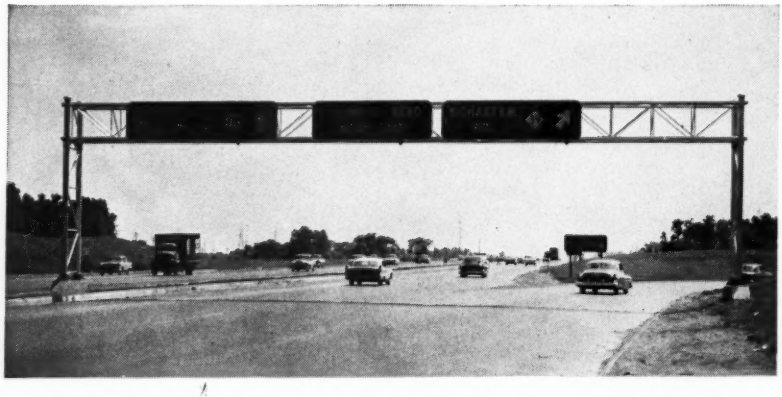
Mr. Johnston has been highway transportation specialist for the U. S. Chamber of Commerce in Washington, D. C., since 1955. Prior to that he worked for the American Automobile Association for three years. From 1940 to 1952, he was traffic engineer for Nebraska, where he organized and ran the traffic engineering division for the Department of Roads and Irrigation (now called the Department of Roads). For 15 years before that he did general highway engineering work for the Nebraska Department.

An engineering graduate of the University of Nebraska, he attended the Yale Bureau, receiving his certificate in 1940. He is affiliated with ASCE and the Highway Research Board as well as the Institute of Traffic Engineers, and is a registered professional engineer.

Bidell Advanced In Ontario Highway Dept. To Program Engineer

William Bidell (Jun. Mem., ITE) has been appointed Program Engineer and head of the newly established Program Section of the Ontario Department of Highways. He was formerly Priorities Engineer in the Planning and Design Branch.

Bidell is a graduate of the University of Toronto with a degree in civil engineering. He has worked for the Ontario Department in various sections since completing school in 1950.



WANTED: Representatives for PLANET HIGHWAY SIGN STRUCTURES

Planet Corporation, a leading supplier of engineered handling systems and automated machinery, is expanding its sales area for its overhead and roadside sign structures. Planet all-aluminum sign structures are expertly designed by experienced engineers. They will withstand hurricane-force winds, can be erected with minimum traffic interference, and eliminate maintenance costs. Planet sign structures are in use on highways in Michigan and Kentucky, and are under construction in others.

Now Planet needs representation in a number of states for this profitable line. If you would like to become associated with this progressive, growing company on either a full or part-time commission basis, write: Personnel Director, Planet Corporation, 1842 Sunset Ave., Lansing, Michigan.

PLANET CORPORATION

• TRAFFIC & SAFETY EQUIPMENT
• ENGINEERED HANDLING SYSTEMS
• AUTOMATION EQUIPMENT

take a reading on this meter!

True value is measured by initial cost divided by the years of faithful service.

Hundreds of progressive municipalities have long discovered that only Duncan-Miller meters rate highest in value received. Here's why:

- No winding by city personnel. No inoperative meters due to run-down springs.
- Five-second "lift-out" mechanism. No screws, bolts or tools required. Speeds all maintenance.
- Effective screening of all bent coins and foreign objects drastically reduces jams and service calls.
- Last coin in meter is mechanically ejected into coin box when mechanism is lifted for service purposes. Eliminates temptation.
- Tough . . . rugged mechanism resists abusive treatment. Simple to maintain with minimum of parts inventory.
- Heavy duty, stainless steel and clock brass timer assures long serviceable life. No professional maintenance personnel or expensive factory services required.
- Hundreds of practical time and rate combinations for curb and off-street parking facilities.
- Accepts pennies, nickels, dimes, quarters and tokens. Easily convertible from one combination to another.
- Substantial housing casting highly resistant to attempts of vandalism. Strong, rugged door area protects meter revenue.
- Exclusive patented sealed coin box offers maximum security with only one locked box.

A Demonstration Will Convince You

Write Today

DUNCAN

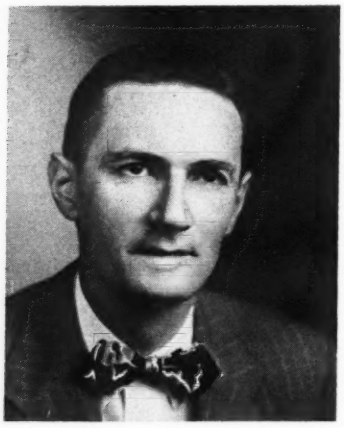
DUNCAN PARKING METER

DIVISION OF MOTOR PRODUCTS CORPORATION

835 N. WOOD STREET • CHICAGO 22, ILLINOIS

Twiss Appointed Deputy Director of Highways for The District of Columbia

Francis E. Twiss (Mem., ITE) has been named Deputy Director for Traffic Engineering and Operations of the D. C. Department of Highways and Traffic. The appointment was announced on April 5 by Mr. Harold L. Aitken, Director of Highways and Traffic for the District of Columbia.



Mr. Twiss was at the time of his appointment serving as engineer-advisor to the Associated General Contractors of America. Earlier he had been director of engineering for the International Road Federation, a position he held for seven years and in which he served as consultant to a number of foreign countries on highway and traffic engineering problems. He also taught at the Yale Bureau of Highway Traffic, and served at one time as traffic engineer for Hartford, Connecticut.

A graduate of Rensselaer Polytechnic Institute and the Yale Bureau of Highway Traffic, Mr. Twiss also worked for the Chamber of Commerce of the U. S., and served during World War II with the Civil Engineer Corps, United States Navy. In addition to his membership in the Institute of Traffic Engineers, he belongs to ASCE, the National Society of Professional Engineers, and the Society of Sigma Xi. He has been a registered professional engineer for more than twenty years.

Avery Named Assistant Chief Engineer In St. Paul DPW

Eugene V. Avery, (Assoc. Mem., ITE) has been promoted to the position of assistant chief engineer of the St. Paul (Minn.) Public Works Department. Avery had been serving as traffic engineer.

Avery's first assignment will be a study of a proposed auxiliary road and bridge system in the downtown area to supplement the planned freeway system. No immediate appointment of a new traffic engineer is planned, and the work there will be carried on by principal assistants under the general supervision of Mr. Avery.

He is a graduate of Case Institute of Technology, and holds a certificate from the Yale Bureau, which he attended in 1952-53. He is a registered civil engineer, and currently is president of the Engineer's Society of St. Paul.

Bacchus Leaves Toronto Planning Board for Consulting Field

Grant A. Bacchus (Assoc. Mem., ITE) has resigned from the Metropolitan Toronto Planning Board to join the staff of A. D. Margison and Associates, Ltd., consulting engineers in Toronto. In his new capacity, Mr. Bacchus will be Traffic Planning Engineer, and his major responsibilities will be in the traffic planning field, involving the conduct of comprehensive traffic studies of cities and towns and the analysis of results. In addition, he will assist in the development of functional plans for road projects and related works.

Mr. Bacchus has been assistant traffic engineer for the Board since 1956. Prior to that, he spent five years with the Ontario Department of Highways as traffic studies engineer and route analysis engineer. He graduated from the University of Toronto with a degree in civil engineering in 1951.

In addition to his other duties, Mr. Bacchus has been very active in the work of the Canadian Section of the Institute of Traffic Engineers, having served as secretary-treasurer of the Section since 1956.

TITLE CHANGES

Rafael Cal y Mayor—was the Executive Secretary of the Comite Nacionale de Communicaciones Vecinales in Mexico City; is now Sub-Director of Telecommunications.

James D. Decker—is now an Associate Traffic Engineer in the Virginia Department of Highways in Richmond; formerly an Engineering Trainee in that department.

Victor M. Labiosa — is now Chief of the Highway Planning & Research Division, bureau of Traffic, Department of Public Works in Santurce, Pureto Rico; was formerly Assistant Chief of the division.

Eugene J. Lessieu—from the position of Highway Project Planner for the Port of New York Authority to the position of Assistant Terminals Planning Engineer.

Samuel J. Levine—now District Traffic Engineer for the Michigan State Highway Department in Pontiac; was a Traffic Engineer for the department in Detroit.

Arthur P. Mueller—formerly Assistant Traffic Engineer for the Illinois Division of Highways at Dixon; is now the District Traffic Engineer.

Harry Porter, Jr.—is now Manager of the Department of Traffic for the National Safety Council in Chicago; was the Executive Secretary of the Traffic & Transportation Conference of the Council.

JOB CHANGES

Stephen George, Jr. — now Assistant Director and Traffic Engineer for the Twin Cities Transportation Study, c/o Minnesota Department of Highways, 1246 University Avenue, St. Paul, Minnesota; was formerly Assistant Transportation Engineer for the City of San Diego, California.

(Continued on page 54)

PARK-O-METER Wins test in Rockford, Ill.

- PREFERRED BY THE PUBLIC
- PROVED 3 TO 13 TIMES BETTER MECHANICALLY

PARKING METER TEST AREA

1 HOUR PARKING

1 PENNY 6 MINUTES

1 NICKEL 30 MINUTES

1 DIME 60 MINUTES

Ten new parking meters from three leading companies were installed alternately on a high turnover street. Mechanical performance was tested for 30 days . . . and a postcard poll was taken on public preference. What happened?

PARK-O-METER WON BY A LANDSLIDE!

AUTOMATIC MAKE "A"
Mechanical Test . . . 27 jams.
Public Preference . . . 10.4%*
MANUAL MAKE "B"
Mechanical Test . . . 6 jams.
Public Preference . . . 9.1%*
PARK-O-METER AUTOMATIC
Mechanical Test . . . 2 jams.
Public Preference . . . 72.2%*

View on North Main Street in Rockford's busy shopping center. Note meters placed alternately in Test Area.

* Meter-maids put 1,000 postcards on parked vehicles. 241 of these cards were returned with the results indicated. 8.3% of those answering expressed no preference.

A REPORT TO THE MAYOR AND COUNCIL STATED:

"The Meter-maids patrolling this area observed that the greatest number of complaints were made concerning the coin slot operation of the Automatic Meter "A", which accounts for the high number of jammed meters of this type. Other complaints were received concerning the two coin-slot operation of the Manual Meter "B", when users inserted a dime in the penny-nickel slot and received only 6 minutes of parking, the same as one penny would produce. The results of the *mechanical field test and public user test* indicate that the low bidder, Park-O-Meter, has produced the parking meter most desirable for use on the streets of Rockford."

YOUR CITY CAN PROFIT FROM THIS TEST!

Magee-Hale
PARK-O-METER COMPANY
3909 Willow Springs Road
Oklahoma City 12, Oklahoma

(Continued from page 29)

2. The *average* speed of vehicles on the test routes did not show any change which could be attributed to the increases in enforcement units.

3. The variance or range of speeds about the average did show a decrease which was associated with increases in the number of enforcement units.

"Since these findings are in general contrary to popularly held beliefs about the effect of enforcement on vehicle speeds, there is little question that the implications raised here should be explored further under more carefully controlled experimental situations," Shumate said.

Another finding was that an increase in the number of enforcement units on a given stretch of highway does not cause drivers to change to a parallel but less desirable route to which no patrol units are assigned.

Accident studies were made before and after the addition of patrol units on the following Wisconsin highways:

Test Route 1 — 26 miles of four-lane divided highway on U. S. 41 from the Illinois line to the Milwaukee County line. (This route had the heaviest concentration of patrol units —Miles traveled per patrol unit observed was 3.)

Test Route 2 — 52 miles of U. S. Highways 12, 18, and 51 in Dane County of which approximately four miles are four-lane, divided highway with partial control of access and the remainder two-lane highway. (Miles traveled per patrol unit observed on this route was 6.5.)

Test Route 3—104 miles of two-lane highway on U. S. 41 from the North Milwaukee County line to Green Bay. Parts of this section had to be eliminated from the study because of major highway construction. (Miles traveled per patrol unit observed—13.)

Test Route 4 — 208 miles of two-lane highway on U. S. 12 from Baraboo to the Minnesota line. (Miles traveled per patrol unit observed—26.)

Fatal and personal-injury accidents showed the greatest reductions on the routes with the heaviest concentrations of enforcement units.

"A more complete inquiry into the relationship between the type of tactics used by enforcement units and the severity of penalties assessed by courts and behavioral changes in the driving population needs to be undertaken," Shumate said.

"It is logical to assume that certain types of tactics or differences in penalties will have greater effect on driving behavior than others. It is important that enforcement tactics which have the greatest effect on driving behavior be identified so that more precise methods of enforcement predicting effect on accident frequency can be developed."

Positions Available

CHAMPAIGN, ILLINOIS

Position: Traffic Engineer, to organize and direct a traffic engineering program in the City Engineering Division in a city of 50,000.

Requirements: B. S. in engineering from accredited institution with some specialized training in traffic. Experience desirable.

Salary: $477 to $576 per month.

Apply: R. H. Oldland, City Manager, City Building, Champaign, Illinois.

HAVE YOU MADE A CHANGE?

If you have moved or changed jobs, please tell us about it.

Title .....
(Position) (Branch)

Organization .....

☐ **Address** .....
(No.) (Street)

City .....
(City) (Zone) (State)

Telephone .....
(Spell Out Exchange)

☐ **Residence** .....
(No.) (Street)

City .....
(City) (Zone) (State)

Check preferred mailing address.

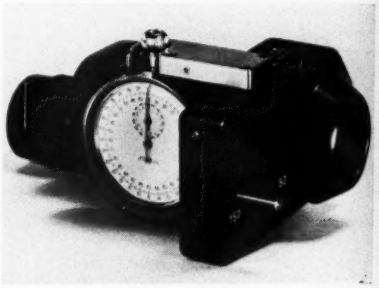
.....
(Print or Type Name)

SEND TO ITE, 2029 K STREET N.W., WASHINGTON 6, D.C.

Strictly Business

Dutch Firm Offers Optical Method of Speed Measurement

Late in the thirties Mr. J. M. Waltman, chief-inspector of police at The Hague and late Dr. Sirks, director of States Marine Institute, designed a monocularglass that owing to a set of especially polished prisms enabled policemen to determine the speed of an approaching car.



This design based on the principle of the telemeter was brought into the Districts Court as well as in the Netherlands Court of Justice and both Professors W. H. Keesoom and W. J. de Haas of the Leyden University confirmed the instrument being a reliable one. The case before the Court of Justice resulted in admission of the evidence obtained by means of this apparatus in court in the Netherlands.

Having gone into force the 1st November 1957 speed regulations in the Netherlands required an instrument that could be easily handled and moreover would not be expensive.

This standpoint gave reason to redesign the instrument discussed and now throughout the country traffic-police are already applying the instrument or asking for demonstrations.

Owing to the fact that speed control by means of this instrument is a one-man job, observations can be made during normal patrols. Within a couple

NIGHT VIEW of Darien-Stamford section of the Connecticut Turnpike, with L-M fluorescent luminaires supplying the illumination.

The Connecticut state highway department has made this turnpike an outstanding example of modern highway design and lighting.

New L-M Fluorescent Luminaires Make Connecticut Turnpike Brighter, Safer

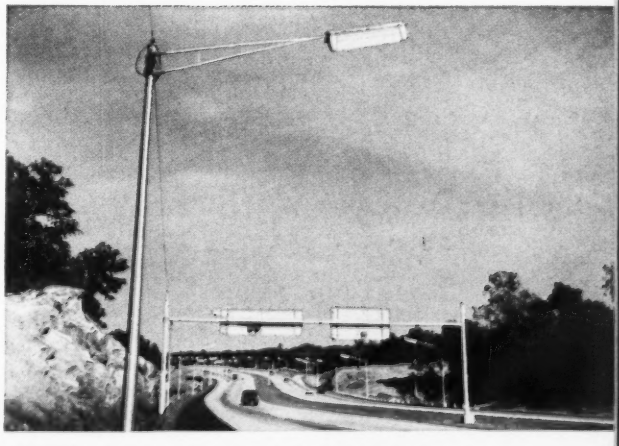
An outstanding example of modern highway design is the Connecticut Turnpike, a 130-mile ribbon across the state from New York to the Rhode Island line. Both in design and lighting, safety was a principal consideration, according to Newman E. Argraves, State Highway Commissioner.

The most heavily traveled sections of the highway are lighted for safer night driving. Line Material fluorescent luminaires were selected for the Darien-Stamford section because of their excellent appearance and the efficiency of the reflector design, which appealed to the state highway department engineers.

Line Material, a pioneer and leader in outdoor lighting, offers a full line of equipment—fluorescent, mercury vapor, incandescent lighting, and all accessories and apparatus. L-M's lighting application engineering is an outstanding service.

What's YOUR Lighting Problem?

Tell us your lighting problem. L-M Lighting Engineers will help you solve it—whether it's a highway, a neighborhood street, an airport, a shopping center, a farmyard or a railroad yard. Ask the L-M Field Engineer for bulletins and information; or write Lighting Division, Line Material Industries, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.



DAYTIME VIEW of the Connecticut Turnpike shows the deep-type 6-foot L-M fluorescent luminaire. Mounting height is 26 to 28½ feet, on 6- to 12-foot brackets, with light centers 30 feet above the highway grade.

LINE MATERIAL® Industries
McGRAW-EDISON COMPANY

McGRAW EDISON

383

Outdoor Lighting

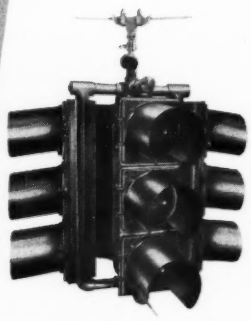
DISTRIBUTION TRANSFORMERS • KYLE RECLOSERS AND OIL SWITCHES • FUSE CUTOUTS AND FUSE LINKS • LIGHTNING ARRESTERS • POWER SWITCHING EQUIPMENT
PACKAGED SUBSTATIONS • CAPACITORS • REGULATORS • OUTDOOR LIGHTING • LINE CONSTRUCTION MATERIALS • PORCELAIN INSULATORS • FIBRE PIPE AND CONDUIT

Manufactured and designed to the highest standards of quality, for those who are willing to pay for the finest traffic equipment made . . . anywhere . . .

MARBELITE *Presents*

Model 1058 Adjustable Signals

A hallmark of the Industry



UNEXCELLED

For superior optical efficiency
For Clean cut functional design
For years of efficient low cost service

UNPARALLELED

For minimum maintenance
For Pleasing appearance
For custom building to your order

Model M-30 Expansible Controllers

The Standard of the Industry

UNEXCELLED

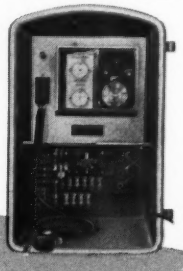
For future growth of a traffic system
For flexibility, interconnects by multi-conductor cable two wire pulse & tome or radio

UNPARALLELED

For instantaneous expansion as required
For accessibility in service
For Excellence of design and workmanship
For minimum maintenance

Model M-20 SVA Semi-Vehicle Actuated Controller

A True Precision Controller



UNEXCELLED

For Accuracy of timing
For Ease of sequence timing
For precision in design and manufacture

UNPARALLELED

For instant accessibility
For long dependable life
For minimum maintenance

MARBELITE

Manufacturers of traffic control equipment . . . exclusively . . . invites you to select for your traffic requirements from the finest traffic controls made . . . anywhere.

WORLDWIDE

In use by the most selective traffic departments throughout the world . . . New York, Honolulu, Chicago, San Juan P.R., Los Angeles, Rio de Janeiro, Philadelphia, Johannesburg, New Orleans, Havana and Baltimore as an example.

THE MARBELITE CO., INC. 179 NORTH TENTH STREET BROOKLYN 11, N. Y.

of minutes the traffic-officer has determined the speed of the car and held it up.

Application in The Hague resulted into an important decrease of traffic (speed) violations, because car drivers never know where and when they are observed.

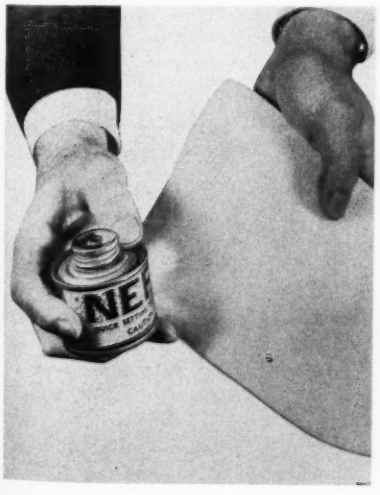
Police-officers who might be interested in this simple, successful device, can obtain information on the subject either from the US distributor, American & Foreign Export & Import Company, 21 West Street, New York 6, N.Y., or the manufacturer/exporter N.V. Zoetmulder & van Winkel, Laan van Meerdervoort 756, The Hague, Netherlands.

Plastic Safety Marker Test Kit Offered

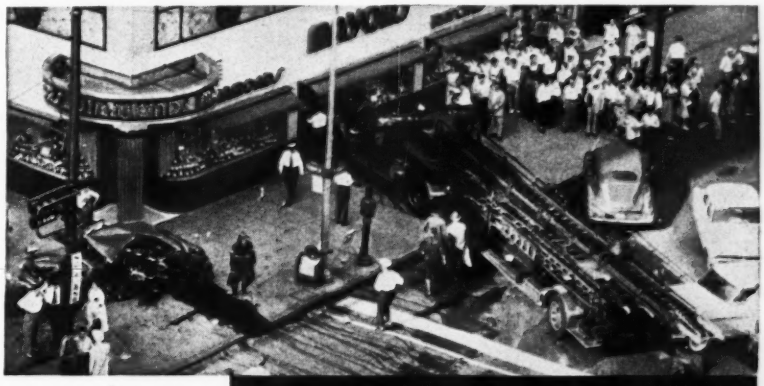
Free test samples of NEFSLABS plastic traffic markings are offered by J. W. Neff Laboratories, Inc., specialists in plastic safety markings for municipal, industrial and commercial use. Included in the test kit is a one-foot sample of six-inch plastic safety strip, a 3-ounce can of quick-setting adhesive, plus complete application instructions.

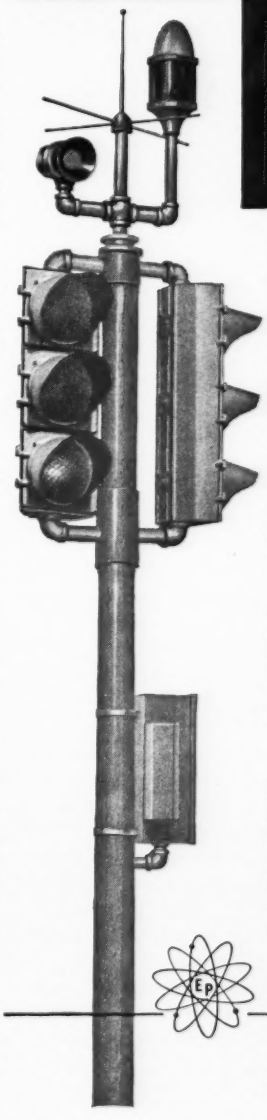
NEFSLABS safety markings stay bright and highly visible year after year through heaviest traffic beatings, eliminating repeated maintenance cost of repainting, the manufacturer says. They are particularly suitable for center city and school streets, highways, shopping centers, parking lots, drive-in banks and restaurants, plants and factories and motels.

Requests for the free kits should be directed to the company at Stockertown 4, Pa.



PREVENT
DOUBLE Tragedies like this!





WITH **EL-TEC**
EMERGENCY VEHICLE
RADIO TRAFFIC CONTROLLERS

City fire personnel and equipment are lost. A home or business burns out of control. Stark community tragedy . . . all because fire equipment could not command the right-of-way. El-Tec Radio Traffic Controllers installed on emergency vehicles prevent these accidents because the driver knows with certainty that he is controlling traffic for blocks ahead.

Control is positive because driver can see pre-set signal operation go into effect as he proceeds.

Simple to operate—driver actuates an "on" switch then controls East or West, or North or South signals by flipping second switch up or down.

Flexible—El-Tec is adaptable to any of the various techniques preferred in controlling regulation of lights.

Economical — El-Tec pays for itself out of savings it effects by reducing costs of accidents, law suits, property damage and by earning lower insurance rates.

El-Tec is the only Federal Communications Commission approved equipment for emergency vehicle traffic control.

Directional antenna pinpoints radio beam to signal

EL-TEC RADIO INTERCONNECTION

El-Tec also manufactures a complete traffic control system giving synchronization, dial transfers or programing, transfer to flash and civil defense evacuation procedures . . . through a central transmitter. It can be added to emergency vehicle control which integrates easily with the system.

For complete information write:

Electronic Protection

Division of Standard Coil Products, Inc.
2073 N. Hawthorne Ave., Melrose Park, Illinois
EXPORT DIVISION. Scheel International, 5909 N. Lincoln Ave., Chicago, Ill.
CANADA. E. A. Horton Sales, Ltd., Peterborough and Toronto, Ontario

PYREX LAMP CARRIER, twelve feet long, encloses two T8 slimline fluorescent lamps, and slips into sturdy fixtures mounted on the ceiling of the tunnel as part of a special lighting system manufactured by the Simes Company. This close-up photo, taken from the roadway of the Fitzgerald Expressway tunnel during installation, shows lamps sealed inside carriers, impervious to moisture. Buff-colored tiles of tunnel wall and ceiling serve as reflectors for the glareless fluorescent light. Replacement of burned-out lights requires only a single stop in the tunnel, since whole carrier units with fresh lamps are used as replacements. Burned-out lamps are later removed and carriers used over again.

Fluorescent Lights Reduce Glare in New Boston Road Tunnel

More than two miles of fluorescent bulbs provide safe illumination for Boston motorists driving through the new tunnel opened as part of the city's John F. Fitzgerald Expressway.

Two rows of light fixtures are mounted on the ceiling next to the walls of both the tunnel's 2,400-foot tubes. They generate even illumination that eliminates glare for drivers.

Although drivers in the new tunnel may be unaware of the fact, the tunnel lighting system makes use of a novel principle in lighting technology. Explained by the Simes Company, Inc., of College Point, N. Y., manufacturer of the lighting equipment, the system directs its main illumination on the walls of the tunnel, rather than on the roadway itself.

By reflecting even light onto the buff-colored tiles of the tunnel walls, explains the company, the tunnel is given an over-all bright appearance. Visibility is made sharper for drivers since other automobiles are actually silhouetted against the lighter walls.

The lighting system installed in the Boston tunnel is similar to others installed by the Simes Company in other vehicular tunnels throughout the U. S. The New York Brooklyn-Battery tunnel, the Baltimore Harbor tunnel, the Squirrel Hill tunnel in Pittsburgh and the West Virginia Turnpike tunnel near Charleston, W. Va., have all been equipped with lighting that employs the same principles and fixtures.

One distinct advantage of the continuous lighting system, according to Simes, is the elimination of spot glare that hits a driver's eye when the car in front passes under a spaced light source. The only breaks in the tunnel's lighting occur at intervals of twelve feet, where transformers and holders are attached to the tunnel ceiling in line with the lights. Use in other tunnels has proved that these twelve-inch breaks are not sufficient to interrupt the light and bounce glare into the eyes of drivers.

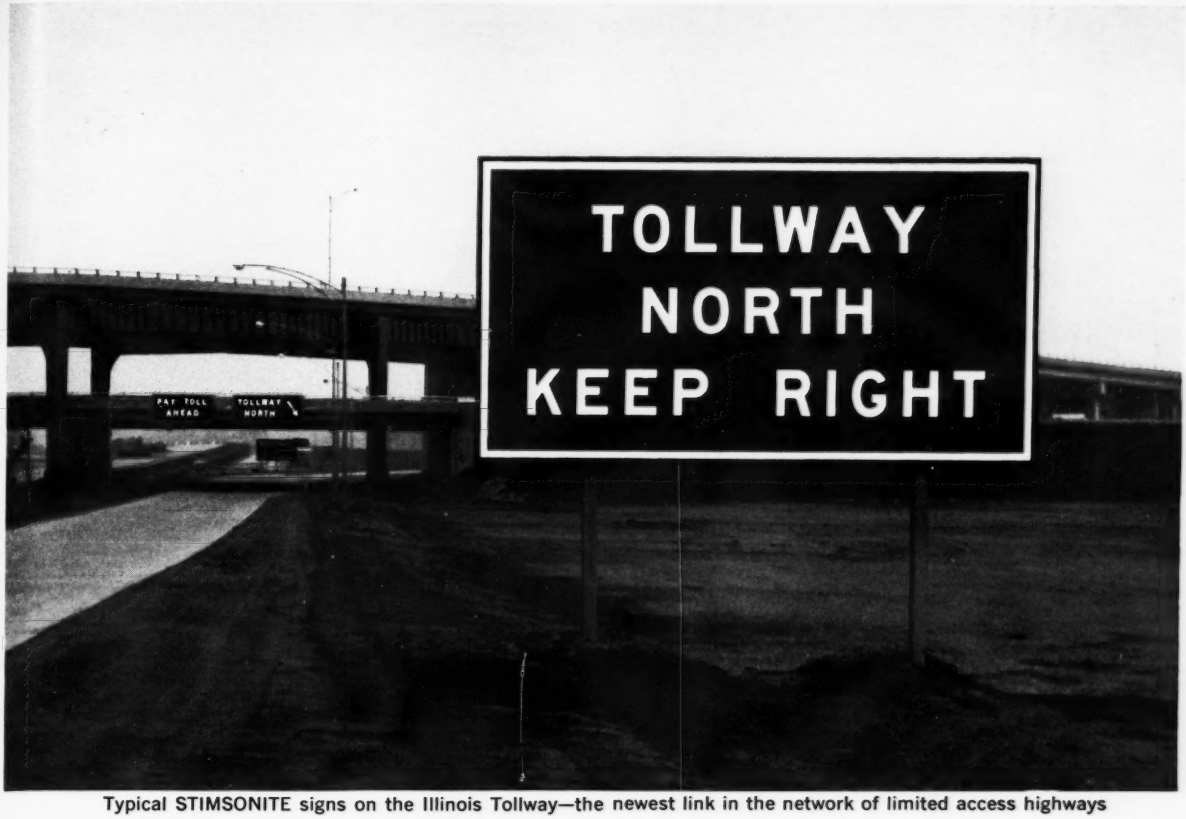
As the widest automobile tunnel in the world, the Boston tunnel required additional fixtures to be installed in the center of the ceiling at entrances and exits. In these places the roadway widens to as much as seventy-five feet. The additional lights here also make it easier for a driver's eyes to adjust to the difference between lighting inside the tunnel and the sunlight outside.

This difference between inside and outside light intensities is reduced by a unique engineering feature of the system manufactured by the Simes Company. Lights are connected in series, and controlled by a saturable core reactor at the source. By varying the amount of current from 100 through 450 milliamps flowing through the reactor, the tunnel engineers can adjust the levels of illumination at the portals of the tunnel. In other systems the only control over levels of illumination requires manual changing of transformers at each fixture along the length of the tunnel.

Control of light intensity is an important factor in the costs of tunnel operation. Particularly at tunnel entrances, lower levels of illumination may be employed after dark, saving appreciable amounts of electricity.

Aluminum Used by TASSCO for Hampton Roads Tunnel Signs

The new sign spans used on the approach to the Hampton Roads Tunnel, Hampton Roads, Virginia, are made of tubular aluminum. They consist of tapered up-rights and a tapered cross member. The manufacturer reports this type of sign span particularly suitable for short span widths and small sign loadings. The light weight of the tubular aluminum facilitates installation, yet the span is



Typical STIMSONITE signs on the Illinois Tollway—the newest link in the network of limited access highways stretching from the East Coast to Chicago and beyond.

On the Illinois Tollway...

STIMSONITE SIGNS THE WAY

Why Stimsonite cutouts are the choice for tomorrow's highways:

- **BRIGHTNESS AND LEGIBILITY**
  Unequalled—because there is no reflective material as efficient as Stimsonite.
- **LONG LIFE**
  Established through use on major highways for more than 7 years.
- **EASY INSTALLATION**
  Sign layout and attachment is quick and simple with Stimsonite cutout letters. No special fasteners needed.
- **VARIETY**
  Over 1000 different letters and accessories . . . designed in conformance with A.A.S.H.O. and B.P.R. Standards

Write for new supplement to Bulletin S-4C on A'G'A' Cutout Characters for Interstate System Signs.

STIMSONITE® *for* *Seeability* *Readability* *Durability*

A'G'A DIVISION

ELASTIC STOP NUT CORPORATION OF AMERICA
1027 NEWARK AVENUE, ELIZABETH 3, NEW JERSEY
In Canada: Gasaccumulator Co. (Ltd.), 12 Gower Street, Toronto 16, Ontario

strong enough to withstand winds up to 100 mph. Another feature of the all-aluminum construction is that it requires no painting or other maintenance. The entire sign program was supplied by Traffic and Street Sign Company, Newark, New Jersey. Pfaff & Kendall of Newark, New Jersey, manufactured the tapered aluminum spans.

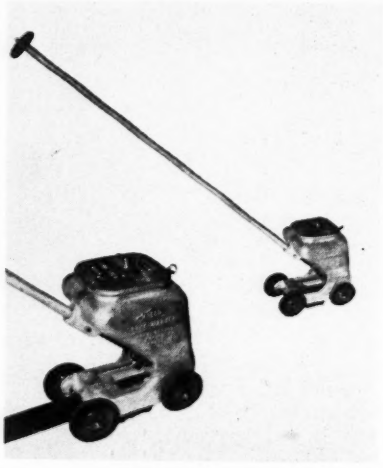
Low-Cost Line Marker Offered by California Manufacturer

A new, low-cost line marker designed to produce clean, sharp lines quickly and economically has been introduced by Cost Reduction Equipment Co., 5200 Chakemco St., South Gate, Calif.

Recommended for precision, controlled line marking in parking lots and stalls, garages, school grounds and other locations, the CRECO line marker is capable of producing up to 500 feet of clean-cut lines before refilling. Straight, curved, or skip lines are made with equal ease at walking speed.

Paint flow is gravity fed on the surface to be marked, eliminating fire and explosion hazards and mist damage to stock, machinery and automobiles. Flow is accurately controlled at the handle grip for maximum efficiency and can be instantly regulated depending on type of surface being marked and speed of application.

Exacting line control is maintained by a built-in line guide and further accuracy is assured by incorporating four large diameter rubber-tired wheels which minimize wavering.



The sturdily constructed line marker weighs only 10 pounds and is well balanced with the center of gravity in such a position that it is easy to lift and move from line to line without danger of upturning.

Quickly interchangeable high quality fiber brushes produce 2, 3 and 4 inch wide lines. Straight through valve from tank permits rapid, waste-free recovery of paint after completion of job. Two-and-one-half quart capacity cast aluminum body is easily filled and cleaned through a large opening.

Manual Issued for Keysort Accident Records System

The Indiana Traffic Safety Foundation, Inc., has issued a booklet covering its accident records system for Indiana cities and counties. Details of this system are available from the Data Processing Division of Royal McBee Corporation, Port Chester, N. Y. Royal McBee manufactures the marginally punched keysort accident card on which the system is based.

The system was designed to meet the problem that accidents occur statewide but do not occur in sufficient number in any one city or county to justify complex processing equipment.

The solution was found in the keysort accident card, since the processing equipment for statistical applications

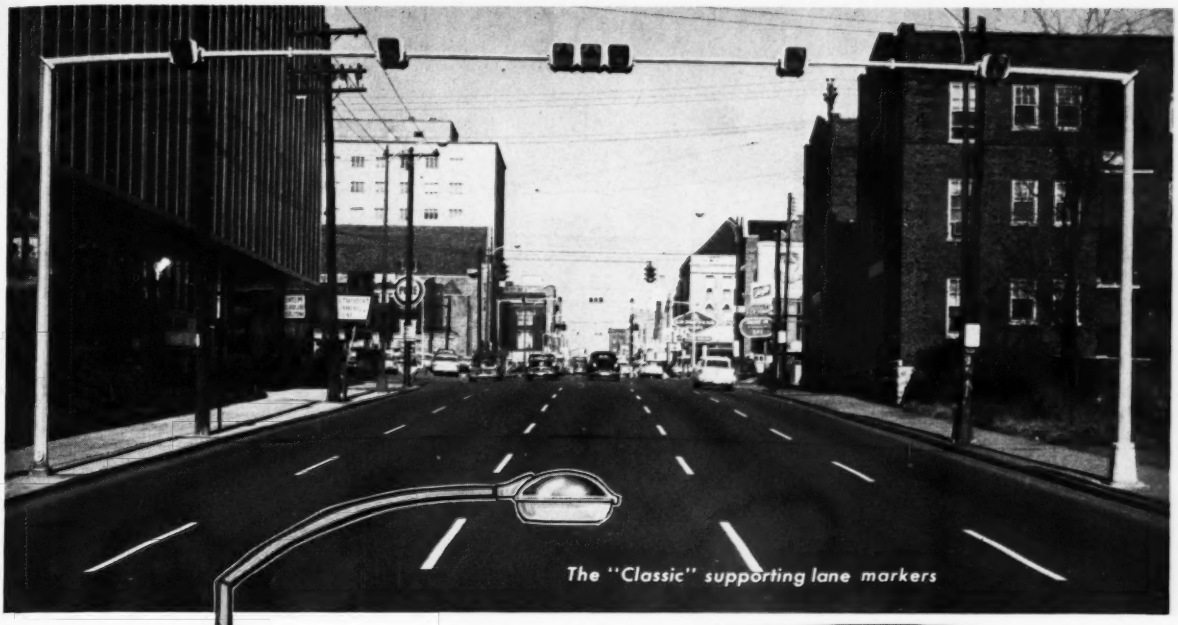
(Continued on page 56)

MOTOR VEHICLE DEATHS AND CHANGES

	DEATHS				CHANGES				
								Last 12 Months	
								4 Months Moving Ave.*	
Month	1956	1957	1958	1959	1956-1959	1957-1958	1958-1959	'57-58	'58-'59
January	2,954	2,882	2,770	2,880	— 3%		+ 4%		0%
February	2,652	2,508	2,360	2,410	— 9%		+ 2%		—1%
Two Mos.	5,506	5,390	5,130	5,290	— 6%		+ 3%		
March	2,940	2,843	2,560			—10%		— 5%	
April	2,970	2,933	2,580			—12%		— 8%	
May	3,094	3,065	3,010			— 2%		— 7%	
June	3,338	3,302	3,000			— 9%		— 8%	
July	3,555	3,308	3,210			— 3%		— 6%	
August	3,535	3,635	3,450			— 5%		— 5%	
September	3,653	3,365	3,330			— 1%		— 5%	
October	3,476	3,466	3,580			+ 3%		— 1%	
November	3,603	3,620	3,490			— 4%		— 2%	
December	3,858	3,775	3,660			— 3%		— 1%	
Total	39,628	38,702	37,000						

*Four Months Moving Average is based on changes between the totals for four months instead of one month. For example, the April figure shows the change between the totals for January-April 1957 and January April 1958, etc. Adding several months together tends to smooth out single month changes which may be affected by differences in the number of weekends in a month from one year to the next, random variations, etc.

All 1956 and 1957 figures are from the National Office of Vital Statistics.
The 1958 and 1959 figures are National Safety Council estimates.



The "Classic" supporting lane markers

The CLASSIC Pat. Pending

NEW ...from Kerrigan

CLASSIC Streamlined Standard and Matching Sign Support

Already receiving praise from traffic and utility officials for its modern, functional styling and easy installation, we believe our new standard and matching sign support "The CLASSIC" will become popular throughout the nation. This new and attractive design is in keeping with the trend to functional, streamlined styling and is the perfect complement to our new streets and highways. The usual banjo work has been eliminated, making installation and maintenance much easier.

Tested for hurricane winds and available in either steel or aluminum, the traffic signal standard can be rotated to any point within a 360-degree circle.

For further information, write, wire or phone CHapel 2-4262

Address: Dep't. TE-5

THE FORGE OF KERRIGAN

Weldforged LIGHTING STANDARD DIVISION

KERRIGAN IRON WORKS, INC.

Nashville, Tennessee

Technical Notes

TOLL ROAD ACCIDENT AND FATALITY STATISTICS

Notes: —

A—State Fatality Rate not available for all 1958. Figures in parentheses indicate number of months covered.

B—Sections of the Toll Highway were opened on the following dates:
Northwest Tollway, August 20, 1958;
Tri-State Tollway, (North), August 28, 1958;
East-West Tollway, November 21, 1958;
Tri-State Tollway (South), December 23, 1958.

C—Accidents involved damage of at least $100.

D—Massachusetts Turnpike: May 16, 1957 to December 31, 1957.

E—Includes only accidents over $100 in property damage in 1958, but all accidents regardless of amount in 1956 and 1957.

F—Includes only accidents over $100 in property damage in 1957 and 1958, but all accidents regardless of amount in 1956.

G—Will Rogers Turnpike: June 28, 1957 to December 31, 1957.

H—Vehicle miles estimated for the month of December.

I—Dallas-Ft. Worth Turnpike: August 27, 1957 to December 31, 1957.

J—Richmond-Petersburg Turnpike: July 1, 1958 to December 31, 1958.

K—TOTAL U. S. A.: Figures are from estimates of the National Safety Council. 1958 figures are a preliminary estimate.

L—Connecticut Turnpike opened 1/2/58; 1956 Figures are for Merritt & Wilbur Cross Parkways.

Facility	Vehicle Miles (Millions)			Total Number of Accidents			Accidents with Injuries			Fatal Accidents			Total Fatalities			Accident Rate (Per 100Mil.Mi.)			Fatality Rate (Per 100Mil.Mi.)			State Fatal. Rate
	1958	1957	1956	1958	1957	1956	1958	1957	1956	1958	1957	1956	1958	1957	1956	1958	1957	1956	1958	1957	1956	1958(A)
Colorado Dept. of Highways Denver-Boulder Turnpike	36.3	34.5	--	36	33	--	8	10	--	0	1	--	0	1	--	99.3	95.6	--	0	2.9	--	5.2(9)
Connecticut State Hwy. Dept. Connecticut Turnpike (See Note L)	530.	Not available	679.5	550		1266	159		555	8		16	8		20	103.8		186.3	1.5		2.9	2.5(10)
Florida State Turnpike Auth. Sunshine State Parkway	171.	151.	--	254	235	--	51	124	--	6	2	--	7	3	--	148.5	156.	--	4.1	2.5	--	5.7(10)
Ill. State Toll Hwy. Comm. Illinois Tollway (See Note B)	65.3	--	--	98	--	--	22	--	--	3	--	--	3	--	--	150.1	--	--	4.6	--	--	4.9(9)
Indiana Toll Road Comm. Indiana East-West Toll Rd.	588.4	522.	112.3	731	625	180	162	142	38	22	14	4	27	14	6	124.2	119.7	160.0	4.6	2.6	5.3	5.1(11)
Kansas Turnpike Authority Kansas Turnpike	246.4	217.	36.0	267	253	47	76	92	12	15	10	1	20	13	1	108.4	116.	131.0	8.1	5.9	2.8	5.9(10)
Kentucky State Hwy. Dept. Kentucky Turnpike (See Note C)	83.7	--	6.2	48	--	20	15	--	8	4	--	1	5	--	1	57.4	--	3.2	6.0	--	0.2	7.5(10)
Maine Turnpike Authority Maine Turnpike & Ext.	187.9	195.2	186.7	229	250	329	80	95	83	3	4	7	3	4	8	121.9	128.	176.0	1.6	2.1	4.3	5.0(11)
Massachusetts Turnpike Auth. Massachusetts Turnpike (See Note D)	439.4	306.2	--	729	408	--	241	126	--	13	10	--	14	10	--	165.9	133.3	--	3.2	3.3	--	3.4(10)

Facility	Vehicle Miles (Millions)			Total Number of Accidents			Accidents with Injuries			Fatal Accidents			Total Fatalities			Accident Rate (Per 100Mil.Mi.)			Fatality Rate (Per 100Mil.Mi.)			State Fatal. Rate
	1958	1957	1956	1958	1957	1956	1958	1957	1956	1958	1957	1956	1958	1957	1956	1958	1957	1956	1958	1957	1956	1958(A)
New Hamp. State Hwy. Dept. New Hampshire Turnpikes	149.5	62.1	55.8	187	52	69	47	20	47	4	0	0	5	0	0	125.1	83.7	124.0	3.4	0.0	0.0	4.1(11)
New Jersey Highway Auth. Garden State Parkway	1495.1	1448.	996.9	959	942	689	345	305	540	13	14	12	15	19	13	64.2	65.1	69.1	1.0	1.3	1.3	3.1(10)
New Jersey Turnpike Auth. New Jersey Turnpike	1238.9	1206.	1070.0	1004	1045	1009	327	385	287	24	20	18	30	24	25	81.0	86.6	94.0	2.4	2.0	2.3	3.1(10)
N. Y. State Thruway Auth. New York State Thruway (See Note E)	1952.2	1700.5	1418.7	1874	3251	2831	524	407	445	17	31	33	17	33	38	96.0	191.2	199.5	0.9	1.9	2.7	4.6(11)
Ohio Turnpike Commission Ohio Turnpike (See Note F)	918.7	909.7	786.4	963	773	1097	238	280	262	17	22	14	29	28	15	104.8	85.0	139.5	3.2	3.1	1.9	4.7(10)
Oklahoma Turnpike Auth. Will Rogers & Turner Tpkes. (See Note G)	263.7	205.7	142.5	186	142	110	51	37	37	15	6	4	24	7	4	70.5	69.0	77.2	9.1	3.4	2.8	6.7(10)
Pennsylvania Turnpike Comm. Pennsylvania Turnpike (See Note H)	1930.1	1854.	1619.4	1809	1930	1651	516	563	584	57	48	56	80	62	74	93.7	104.1	101.9	4.1	3.3	4.6	4.1(10)
Richmond-Pete. Turn. Auth. Richmond-Petersburg Turn. (See Note J)	65.0	--	--	67	--	--	21	--	--	0	--	--	0	--	--	103.2	--	--	0	--	--	5.4(11)
Texas Turnpike Authority Dallas-Ft. Worth Turnpike (See Note I)	123.1	37.5	--	105	28	--	34	6	--	5	0	--	5	0	--	85.3	16.0	--	4.1	0	--	5.1(10)
West Va. Turnpike Comm. West Virginia Turnpike (See Note C)	99.5	100.0	94.0	184	149	152	116	139	43	5	10	5	8	14	8	184.9	149.	161.7	8.0	14.0	8.5	6.1(10)
TOTAL TURNPIKES	10584.2	8949.4	7909.2	10280	10116	11389	3033	2731	3440	231	192	192	300	232	241	97.1	113.0	144.0	2.8	2.6	3.0	
TOTAL U. S. A. (See Note K)	665,000	650,000	628,381										37,000	38,500	39,628				5.6	5.9	6.3	5.6(12)

Compiled in February 1959 by American Bridge, Tunnel and Turnpike Association, Inc.

SEEING AND DRIVING

By A. R. Lauer
Driving Research College
Iowa State College

A common fallacy of the present day is that the driver's eyes must be fixed on the pavement at all times for safety. Perhaps nothing is farther from the truth. Obviously a person who is leisurely driving and turning his head to examine the landscape without reference to where he is going, is a hazard. It appears from certain observations which have been made that keeping the eyes fixed in a given position will tend to induce fatigue and drowsiness. When one is reading he becomes drowsy unless occasionally he looks off into the distance to rest his eyes. In driving the same is true. It is necessary that a driver look off to the side to some extent and at periodic intervals. From studies conducted in the Iowa State College Driving Research Laboratory, it appears that anything happening within an angle of zero to 30 degrees to each side has little effect when it is of a casual nature. Beyond this range there is practically no effect. If some very unusual occurrence such as a burning house, an automobile rolling down an embankment, or some other unusual condition exists, perhaps this does tend to distract the driver and result in a hazard. However, any ordinary kind of stimulus object which is not moving, and is not likely to interfere with or run across the path of the driver, seems to aid in keeping him awake and at a higher level of efficiency, thus increasing safety.

Another aspect of the problem is that if one's eyes are fixed on the road he will not notice what is going on around him. He may not notice traffic coming from the right or from the left, nor be aware of other hazards which may move across his path. Therefore, it is safe to say that the eyes must be roving and constantly searching for stimuli which will need to be evaluated in terms of safety. To restrict normal stimulation in the field of vision, or movement of the eyes, is to impose extra hazards.

The common theory of highway designers now is that all types of stimulation, visual and otherwise, should be reduced to the minimum along superhighways. This has been carried out to such an extent that it is defeating its own purpose. All are agreed that right angle traffic should be eliminated on superhighways. Certainly this is an excellent principle to follow and has accomplished much to reduce accident hazards. However, the idea that the driver is perfectly safe and in no danger whatever, by virtue of eliminating cross traffic, is far from the truth. He lulls himself to sleep with a false sense of security and therefore frequently gets into trouble. It would appear that some type of exciting stimulation should be introduced along the highway periodically in order that the driver may be kept at his highest level of efficiency.

New Publications

Proceedings

Canadian Section, Institute of Traffic Engineers, Toronto, May 1958. Mimeo. $2.00. (Order from Grant A. Bacchus, 179 Tavistock Rd., Downsview, Ontario, Canada.)

This document reports the principal papers presented at the May 1958 meeting of the Canadian Section of the Institute of Traffic Engineers, held in Toronto. Of particular interest is the first paper reported, "Warrants for the Installation of Traffic Control Signals," by J. T. Hewton, Operations Engineer for the Traffic Engineering Department of the Municipality of Metropolitan Toronto. Other papers and discussions include those on speed zoning, traffic control at the Homer Bridge, parking in Toronto, the application of accident data in the field of traffic engineering, uses of computers in traffic and highway engineering, and freeway traffic flow.

Proceedings

11th Annual Northwest Traffic Engineering Conference, Corvallis, Oregon. Mimeo. 121 pp. January 1958. Published by the Oregon State Highway Department, Salem, Ore.

This publication is a verbatim report of the 11th Annual Northwest Traffic Engineering Conference held in January 1958 on the campus of Oregon State College under the joint sponsorship of the College, the Oregon State Highway Department and the Western Section of the Institute of Traffic Engineers. Conducted principally as a series of panels, the Conference included the following major subjects: Oregon's manual on traffic control devices; the relationships between the Interstate Highway System and the community; the application of traffic engineering principles; urban arterial planning and standards; new products; and new developments in the Northwest.

Improving Highway Transportation Through Official Coordination

Automotive Safety Foundation, 200 Ring Building, Washington 6, D.C. January 1959. 19 pp. Free.

This pamphlet reports a number of speeches presented at a meeting of the Traffic and Enforcement Committee of the American Association of Motor Vehicle Administrators in September 1958. Included are addresses by B. R. Caldwell, Joseph E. Havenner, Hoyt Ray, and Edward Scheidt.

Cost of Passenger Car Accidents to Utah Motorists in 1955

Research Department, State Road Commission of Utah, 525 West 13th South, Salt Lake City 15, Utah. 1959. $5.00.

This report, prepared in cooperation with the U. S. Bureau of Public Roads, is another in a series of cost studies started several years ago in Massachusetts. This report is in tabular form throughout, and does not contain a summary or conclusions.

Of particular interest will be the reported ratios of one fatal accident to 118 non-fatal accidents and one fatal accident to 550 property damage only accidents. In urban areas, these ratios were 1 to 190 and 1 to 742 respectively, and in rural areas, 1 to 62 and 1 to 350. These figures confirm the findings in other states; namely, that commonly used ratios of non-fatal to fatal accidents are much too low.

Total dollar losses (direct costs) of accidents involving Utah cars in 1955 came to approximately $24-million. Of this total, costs of non-fatal injury and property damage accidents each came to more than $11-million, with fatal accident costs reaching only about a quarter of a million dollars.

Proceedings—28th Annual Meeting—Institute of Traffic Engineers

Institute of Traffic Engineers, 2029 K Street NW, Washington 6, D. C. 1959. 146 pp. $2.00.

The volume is a report of the ITE meeting held in November 1958 in Miami Beach, Florida. It contains all the major papers presented, and in addition includes the stenographic report of two panel discussions for which no manuscript was prepared. Reports presented at a few of the technical committee meetings are also included. In all, nineteen separate papers or discussions are contained in the book.

FREEWAY SEMINAR IN TEXAS

Shown at the Texas Freeway Operations Seminar, held in February near Fort Worth, are Dave Baldwin, Executive Secretary of ITE, and three of the speakers' team, O. K. Normann, Bureau of Public Roads; William H. Polkinghorn, Detroit Police Department; and Charles M. Noble, consultant.

Oregon and California Plan June Seminars

Two seminars on Freeway Operations have been scheduled for the West Coast in June. These are the last two in the current series, which started more than a year ago in Columbus, Ohio.

The first of the two will be held at Eugene, Oregon, on June 18-20. This seminar will serve the Pacific Northwest area. Local arrangements are in the hands of a committee headed by F. Bruce Crandall, traffic engineer of the Oregon State Highway Department.

The second seminar will follow immediately at Santa Barbara, California, on June 22-24. Arrangements at Santa Barbara are under the chairmanship of John W. MacDonald of the Automobile Club of Southern California. This program is designed to serve the southern part of California, Arizona and Nevada.

Traffic engineers, design engineers, maintenance engineers, planners, po-

NOW!

a NEW solid-color PVC

POLY-CONE*

tough, durable, no seams, will not CRACK, TEAR or BREAK!

This new SAFE-T-CONE never needs repainting. Just wash it with soap or solvents. Made of polyvinyl-chloride to produce the toughest, *most durable cone on the market.* Outlasts ordinary cone many times . . . . without upkeep!

*Polyvinyl-chloride

Brilliant SOLID YELLOW or SAFE-T-GLO COLORS

SAFE-T-CONE®

TRAFFIC GUIDES

2191

28" 18" 12"

All-Rubber SAFE-T-CONES available in 3 SIZES!

Painted or Reflectorized ALL RUBBER

Regular all-rubber SAFE-T-CONES, now better than ever. Painted standard red and yellow or reflectorized.

Plastic or All-Rubber FLUORESCENT

New Poly-Cones and All-Rubber cones available in brilliant orange-red fluorescent for extra brilliance, day or night.

SAFE-T-CONES made only by Radiator Specialty Co.

Charlotte, N. C.

MUNICIPAL® Signs

Since 1922

America's Leading Manufacturer of Sign Blanks and Signs for Federal and State Highways, County and Township Roads, City and Village Streets.

Sign Blanks Ready to Finish

Blanks Furnished to Your Requirements
Painted, Beaded or Unpainted, Ready for Lettering

SPEED LIMIT 35 · NO PARKING ANY TIME · STOP · NO U TURN · SLOW SCHOOL · Traffic and Warning

Few of many thousands of customers: States and Thruways of Alabama, Arkansas, Mississippi, New York, Pennsylvania Virginia, etc. etc.

Let Us Quote on Your Requirements of Standard or Special Sign Blanks and Signs.

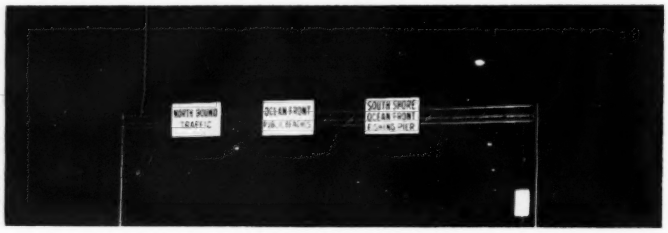
MUNICIPAL STREET SIGN CO., INC.

College Point, Long Island, New York

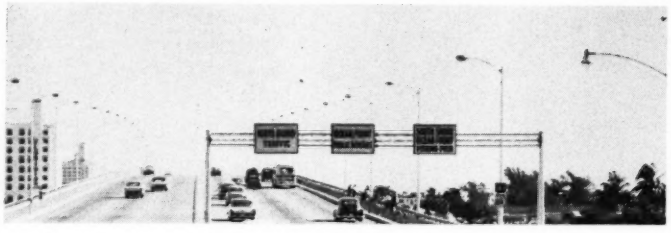
SIGNS OF PROGRESS

By

WINKO-MATIC®



NIGHT AND DAY



SINGLE FACE INTERNALLY ILLUMINATED SIGNS

DIRECTING TRAFFIC NIGHT AND DAY ON THE McARTHUR CAUSEWAY LEADING TO MIAMI BEACH, FLORIDA.

Represented in Florida by Nat H. Rambo, Tallahassee

MUNICIPAL AND STATE TYPE ILLUMINATED SIGNS

come in many sizes, single or double faced and available for truss type, mast arm or span wire mounting. All aluminum construction, plexiglas face either flat or molded, slim line or High Output Fluorescent tubes available for replacement from most suppliers. Light source will start at —20 degrees.

Molded Plexiglass face provides shadowless illuminated face and reduces net weight of sign. Signs pictured above are 6 feet horizontal and 4 feet high. Standard sizes available from stock:

24" x 30" Single and Double Faced
24" x 36" Single and Double Faced
48" x 48" Single and Double Faced
48" x 72" Single Faced

All other sizes for any type mounting will be quoted by return mail.

MAKE YOUR DIRECTIONAL SIGNALS VISIBLE AT ALL TIMES BY INTERNAL ILLUMINATION. PLAINLY LEGIBLE 24 HOURS A DAY.

THEY ARE NO GOOD IF THEY CAN'T BE SEEN

CALL YOUR LOCAL WINKO-MATIC REPRESENTATIVE OR WRITE

WINKO-MATIC® SIGNAL COMPANY

LORAIN, OHIO

Cable Address: WINKO — LORAIN, OHIO, U. S. A.

lice traffic supervisory officers, and others with responsibility for freeways at the planning, design or operations stages are invited. Address the local chairmen for additional information, or write to the Institute of Traffic Engineers, 2029 K. Street NW, Washington 6, D. C.

Section News

LOCAL SECTION MEETINGS

June 5, 6 & 7—Indiana,, Michigan, and Ohio Sections (including Ontario) Pokagon State Park, Angola, Ind.

June 26 & 27 — Texas Section — Summer Meeting—El Paso, Texas

July 29, 30 & 31—Western Section—Annual Meeting — Benjamin Franklin Hotel, Seattle, Wash.

METROPOLITAN (N.Y.) SECTION

U. S. Route 1

Back in 1935, U.S. Route 1 between Trenton and New Brunswick consisted of three slabs of concrete totaling 39′ in width and operated as a four-lane undivided highway. The decision was made to make this heavily traveled road a four-lane divided highway. In order to accomplish this, a rather unique method was used in order to salvage the existing pavement. The westernmost slab which was 14½′ wide was moved by means of fire hoses a distance of 12′. This 12′ separation was used as a median strip, an additional lane for southbound motorists was provided by pouring concrete slabs west of this moved row of slabs. In those days, island openings were provided for left turns and for U-turns along divided highway.

Today U.S. Route 1 is in for another "first" in that it is presently being given a complete overhaul so as to take the left turn our of the uncontrolled category by the use of diagonal roadways commonly known as jug handles. These jug handles will be controlled by traffic signals and all turns will be made from the right lane. Approximately 25 miles is involved which will consist of 29 signalized intersections all of which will have jug handles. In addition to the jug handles and the traffic signals, the existing 12′wide median strip will be replaced by a barrier type center island with the northbound and southbound roadways consisting of 37′ which will be blacktop surface for the entire width and a 10 to 12′ shoulder included in the 37′. The shoulder will be marked off with a solid white line that is presently used as the edge of pavement marking.

One intersection will be reserved for experimentation by the R.C.A. people where they intend to install a pickup loop for their electronic detector. This will be done after resurfacing as it seems it is easier to cut slots in the pavement after it is laid than to hold wire loop in proper positions while it is being laid.

Under this arrangement, all left turns and cross traffic will proceed only under the protection of a traffic signal along this 25 mile section of U.S. Route 1. This renewal job is presently underway and the existing concrete roadways will serve as a base for the blacktop pavement.

Low Level Lighting on High Level Bridge

A low level fluorescent lighting will soon be in operation on the new high level Manahawkin Bay Bridge. This type of lighting is a departure from the high level lighting which is universally used. It will consist of 384 separate fluorescent lighting units mounted in the top railing of the 2400' long bridge balustrade. Each 42" long unit is spaced approximately 2' from the next and the lights' rays are directed to the bridge's four lane wide concrete roadway at right angles to traffic. Tests of the lighting indicated uniformity, elimination of glare and because the light is delivered to the roadways in almost horizontal direction from a low level source, it will be more effective in fog, rain or snow. The overall project will be open for full operation early in the Spring of this year.

Personals

Mike Dimitri has recently been promoted to Assistant Vice President of Ramp Consulting Services, Inc. Mike was formerly with the New York Department of Traffic.

Lloyd Maeder, Director, New York State Traffic Commission and Paul Petrillo, Assistant Director, Traffic Engineering & Safety Department, Automobile Club of New York, were speakers at a meeting of the Association of Towns at Hotel Roosevelt on February 10th. Lloyd spoke on traffic engineering assistance which is available to municipalities by his organization. Paul spoke on pedesrian safety.

Bob Nolan, Senior Highway Engineer, Bureau of Planning & Traffic, New Jersey State Highway Department, has been with our Metropolitan Section only a short time. However, since that time attendance by members of the Highway Department at our meetings has steadily increased reaching a total of 24 at our last meeting in New Brunswick. It has been reported that six have recently made application for the ITE from this organization. Bob, if you have anything to do with this awakening, keep up the good work!

Through the grapevine, it has just been learned that another powerful force in the form of Wes Bellis, Chief of Traffic Design & Research, had much to do with the wonderful turnout of the New Jersey Highway Department men. If this combination persists and increased membership from this source results, perhaps more meetings in New Jersey may be in order.

Jack Cade, Principal Traffic Engineer, with his acceptance into both the Institute and the Metropolitan Section joined his Chief, Herb Klar, and fellow engineers, Bill Bartels and Steve Petersen, to post a 100% membership of the engineers from the New Jersey Bureau of Traffic Safety.

Ernie Boulding, Traffic Engineer for Bergen County, who was formerly with the New Jersey Bureau of Traffic Safety, is embarking on a county wide speed zoning program to fill in his spare moments.

John Crosby, Assistant Traffic Engineer, New Jersey Turnpike Authority, is to be congratulated on his very fine article "Accident Experience on the New Jersey Turnpike" which was published in the February issue of Traffic Engineering.

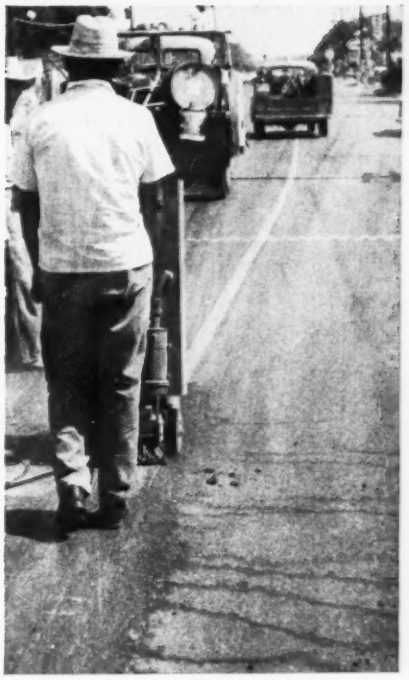
Time Saver

The use of templates in laying out types of signs as evidenced by the cover of the February issue of Traffic Engineering reduces drafting time considerably. The New Jersey Bureau of Traffic Safety saves considerable drafting time and makes neater plans by the extensive use of stamps for the more commonly used signs.

TENNANT Traffic Line Eraser...

Removes traffic lines

- **fast** (4 TO 10 FEET PER MINUTE)
- **easily** (IT'S SELF-PROPELLED)
- **at low cost** (DOES JOB FOR 1¢-4¢ PER FT.)



OPERATOR guides machine at slow walk. Cutting head cleans path up to 8" wide.

Here's a machine that removes traffic lines faster, easier, and at less cost than any other method we know of . . . the TENNANT Traffic Line Eraser.

Does job in one operation. High speed 1450 rpm cutter-equipped cylinder pulverizes, shaves off paint lines in a single pass. Removes old markings permanently; no bleed-back.

Has self-propelling action. Makes line erasing a one-man job. Cutter head moves machine forward at a slow walk; you merely guide it. Cutters can be spaced to cover path up to 8" wide.

Removes 4 to 10 ft. per minute. Saves time; eliminates need for sand blasting or chemicals. No need to tie up traffic. Removes lines at a cost of about 1¢ to 4¢ per foot. Ideal for concrete and most other paved surfaces.

Has many special uses. Excellent for cleaning lines for repainting; helps assure good bond for new paint. Also used for erasing tire marks; cleaning up oil spots; roughening slippery areas; smoothing ridges, minor humps, etc.

WRITE *for details.* G. H. Tennant Co., 719E N. Lilac Dr., Minneapolis 22, Minn.

TENNANT

TRAFFIC LINE ERASER

SPECIALIZED MAINTENANCE EQUIPMENT

WESTERN SECTION

Inter-Mountain Area

Willard A. Kemp, Acting Chief Traffic Engineer for Utah, reports that the Utah Highway Department is embarking on an extensive overhead signing program using Interstate Standards. Four sign structures are now under construction with more to follow.

Maurice RiChey, Montana Traffic Engineer, reports that they presented to the legislator four bills dealing with traffic control on the Interstate System. Two of the four were successful. One legalizes use of the Interstate Sign Manual and the other restricts the erection of any signs on the highway right-of-way except by the Highway Commission. The latter also provides penalties.

Maurice spent the first three weeks of January in Austria on a skiing trip. He had lots of fun watching pedestrians in Vienna run for the curbs.

Montana authorities would like to see a survey on the striping of shoulders on two-lane, two-way highways as to type of striping and relative position of striping related to width of shoulder.

Al Pepper presented a paper titled "The Operation of Uphill Traffic Lanes" for the Annual Highway Conference at Colorado University in Boulder.

Lou Kisseleff attended the Traffic Engineering Seminar at Northwestern University in Evanston, Illinois.

On the evening of March 12th, Boise Valley ITE members and their friends from Boise and neighboring cities held their second dinner meeting in Boise. Dale Hamil-

WASHINGTON (D.C.) SECTION

The Washington Section celebrated its annual Ladies Night on March 6 with a dinner and dance at the Columbia Country Club. Shown above is a portion of the awarding of door prizes, with Helen Mattson doing the honors. At the extreme right of the picture is the president of the Section, Al Voorhees. Holding her prize is Mrs. Keith Stonecipher from Baltimore, one of many who came down from that city for the occasion.

ton, Arrangements Chairman, lined up a very interesting technical program for the 25 people in attendance. This group first heard Cecil Hathaway present his findings on a research project entitled "Pulsating Flashing Signal Units," a subject studied by Cecil when he attended the ITTE at Berkeley. Ed Equals, Planning Survey Engineer, then outlined the program for O-D Studies in Caldwell and Nampa. Out of state guests included Jack Shockey from Denver, "Skinny" DeYoung from Los Angeles, Al Matthews from Seattle, and three Oregonians namely Bruce Crandall, Al Head, and Dennis Peterson. All in all, this was an enjoyable get-to-gether, and the group from Idaho is grateful to its out of state friends for traveling so far to attend this meeting.

Arizona-New Mexico Area

Wilbur Smith & Associates are conducting a study in the Phoenix Metropolitan Area to arrive at a master street plan. The information obtained from the Phoenix-Maricopa County Pilot Study is proving to be quite useful to them, and the completed study is expected around September 1st.

Just recently, the City of Phoenix was awarded the honor of being an All America City. This is an award given several cities annually, and is sponsored by the National Municipal League and others.

In an effort to obtain railroad warning signalization for railroad grade crossings in Phoenix, the Arizona Corporation Commission is again being requested to conduct a hearing and come up with a need for signalization.

Several members of the Traffic Engineering Division of the Arizona Highway Department are attending a school on lighting conducted by the Arizona Public Service Company. This is a nine-week course dealing with fundamental theory on lighting and leading up to the design and practical application of lighting.

The Arizona Highway Department is making progress on the Interstate Program, and the Traffic Engineering Division will be required to furnish a design for the signing within the next few months.

Oregon Area

The west approaches of the Hawthorne Bridge were opened March 16, 1959. The new ramps are expected to handle traffic much more efficiently than the old approaches, since they cross over S. W. Front Avenue. With the opening of these new ramps, Portland has all of its bridges in full operation again for the first time in several months.

Another recent improvement is the westbound off-ramp of the Banfield Freeway leading to N.E. Holladay Street at N.E. 13th Avenue. This ramp draws most of the traffic desiring to go north on N.E. Grand Avenue, and it has been noted that some motorists prefer this route and the Steel Bridge in reaching the downtown area. This new off-ramp relieves the congestion during the A.M. peak at the N.E. Third Avenue exit.

Sacramento Area

On March 2, 1959, the regular monthly meeting of the Sacramento Area, WITE, was held. The two main items of business were discussions on communications from President Bob Dunn regarding hosting National Meeeting in 1962, and from Vice President Ross Shoaf on setting of the Area boundary. The first item was dispensed with an emphatic "no desire to have the honor." The second item was discussed with the result that Charles Zell is to prepare a map of the group's idea on what the boundary should be and forward same to Ross.

On February 28th, the Sacramento Area had a dinner meeting with their wives, honoring Dick Wilson on his retirement. After a few words by Bruno Dentino and Dick, Charles Zell showed slides of his trip to Europe with Dud Stevens running the projector. Needless to say, the slides proved most entertaining. It seems Zell needs a "spirit level" on his camera so vertical buildings, et cetera, will look vertical on the screen. Jim Wilson, Dick's replacement in District 10, was on hand to meet the group. Glad to have you with us Jim.

San Diego Area

The San Diego Area participated enthusiastically in National Engineers Week by sponsoring an exhibit at the National Engineering Exposition held in Balboa Park. A balanced presentation of traffic planning and operations was ably manned by local members and was well attended and deemed a success on the basis of public response.

Stephen George, Jr. recently announced his acceptance of the position of Assistant Director-Traffic Engineer of the Twin-Cities Transportation Study. Steve's loss to San Diego will be keenly felt. He has been directly responsible for establishing the continuing traffic planning studies such as travel time, capacity, and parking for the Transportation Study in San Diego. The entire San Diego Area joined together on Friday, March 20th, to extend their cordial best wishes to Steve. In an effort to provide for his leisure time in the deep snow, he was presented with motive power for Santa Fe Diesel line HO scale "snow plow."

Keith Gilbert reports that the basic planning and traffic generation data for assignment of traffic to a freeway and major street study system for a population of 2.5 million has been completed and turned over to the California Division of Highways. ITE'er Chuck Strong of the California Division of Highways actively is participating in this traffic assignment project.

Ed Hall presented a paper on San Diego's Transportation Planning studies at the Los Angeles meeting of the ASCE in February. Ed also enjoyed the hospitality of Michigan State University while participating in the Conference on Urban Transportation held at East Lansing, February 18th through 20th. This conference was the first of its kind to present the program of urban transportation fact gathering and planning of the National Committee on Urban Transportation. Ed reports that the ice fishing in northern Michigan can only be compared to the snow shoeing in the vicinity of Shelby and Cadillac.

Data processing of the downtown cordon study was mechanized for the 1958 study, Steve George, who was responsible for the field study, and Keith Gilbert, who was responsible for the mechanization of the data processing, worked together to save the City of San Diego 460 man-hours in the analysis of the cordon study. The cordon analysis for 1957 required 760 man-hours of office analysis whereas only 268 hours of aide time plus 40 hours of tabulating time were required for the 1958 office analysis.

The local area was honored by the presence of Chuck Haley of Phoenix at its business meeting held Friday evening, March 20th, in the City Traffic Engineer's Office. Chuck is now on military leave at the Marine Recruit Depot (a fine place for a Seabee).

UNIVERSITY OF ILLINOIS STUDENT CHAPTER

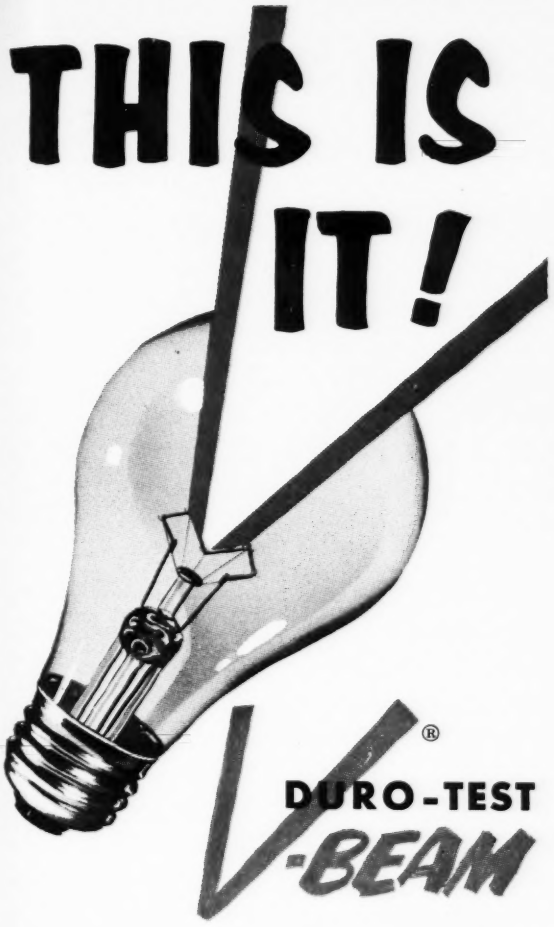
Officers of the Illinois Student Chapter elected for the Spring Semester are:

William Bunte ..... *President*
Charles G. Herrington Jr. ..... *Vice President*
Milton S. Fistel ..... *Secretary-Treasurer*
410 E. Green St., Champaign, Illinois
Prof. John E. Baerwald ..... *Advisor*

Total student membership as of March 15, has reached nineteen, plus one Junior Member.

At the March 5 business meeting, Prof. John E. Baerwald gave a talk on the Champaign's downtown parking problem and the possible solutions suggested by Champaign's City Council.

THIS IS IT!



DURO-TEST V-BEAM®

AMERICA'S FINEST TRAFFIC SIGNAL LAMP

This is the traffic signal lamp with the exclusive filament construction that V-beams 28% more light toward oncoming drivers than ITE specifications require!

This is the lamp that delivers 8,000 hours of bright life in its 67 watt size...5,000 hours in its 40, 60, 100, 150 watt sizes. The 150 watt Super V-Beam fits either 8" or 12" signals. Super-safety hint; use for super-visibility in red lens sections.

5000 and 8000 HOURS

© 1959 by Duro-Test Corp. All rights reserved

DURO-TEST CORPORATION

NORTH BERGEN NEW JERSEY

Duro-Test Electric Ltd. Toronto, Ontario
23 Gurney Crescent

Montreal • Winnipeg • Vancouver

VEEDER-ROOT VARY-TALLY

Multiple-Unit Reset Counter

* Veeder-Root does *not* make or supply this or any other type of mounting board for the Vary-Tally Counter.

...makes Traffic Counting easier, faster, more accurate

This traffic tally board was designed by the traffic engineers of a large eastern city, and produced by them for their own use.* 3 Vary-Tallies on each side of the board count and classify all traffic entering intersections from any direction. Positive action of the large finger-keys makes it easy for operator to keep up with heaviest traffic flow.

Veeder-Root makes the Vary-Tally in any combination up to 6 banks high and 12 units wide . . . also in single units. All counters in one bank are reset by one turn of one knob. See how Vary-Tallies can help in *your* traffic-control problems. *Write.*

VEEDER-ROOT also makes Hand Tallies (single) and counters for Parking Meters, Metering Devices, Wheeled Measuring Devices.

"The Name that Counts"

VEEDER-ROOT INC.

HARTFORD 2, CONNECTICUT
TEL. JACKSON 7-7201

MEMBERSHIP APPLICATIONS

The Institute of Traffic Engineers welcomes applications from qualified traffic engineers, but does not desire as members persons who are unqualified. Listed below are the names of those from whom applications for membership or transfer in grade have been received since the last published list. Institute members are urged to review this as soon as possible and immediately inform the Executive Secretary's office if names of people are found who are known to be unqualified for ITE membership or transfer.

NEW APPLICATIONS

ABRAHAMSON, Royal T.
Assistant Traffic Engineer, City, P. O. Box 1971, Amarillo, Texas. April 6, 1959 for JUNIOR grade.

BARNES, Charles F., Jr.
Project Engineer, Connecticut Highway Department, 24 Wolcott Hill Road, Wethersfield, Connecticut. April 8, 1959 for JUNIOR grade.

BERTOLINA, Charles J.
Planning Engineer, Research Department, State Road Commission of Utah, 525 West 13th South, Salt Lake City, Utah. March 10, 1959 for ASSOCIATE grade.

BROWN, Richard C., Jr.
Highway Engineering Trainee, Virginia Department of Highways, 1221 East Broad Street, Richmond, Virginia. March 12, 1959 for JUNIOR grade.

CLARKE, John L.
Signal Engineer, City Signal Department, 180 Rupert Avenue, Winnipeg, Manitoba, Canada. March 19, 1959 for ASSOCIATE grade.

COFFIN, John F.
Assistant Traffic Engineer, Department of Traffic & Parking, City, 200 Orange Street, New Haven, Connecticut. April 3, 1959 for JUNIOR grade.

DELANY, Desmond J.
Assistant Traffic Engineer, Country Roads Board, Exhibition Building, Carlton, N. 3, Victoria, Australia. March 18, 1959 for ASSOCIATE grade.

DeROSE, Frank, Jr.
Highway Traffic Engineer, Michigan State Highway Department, Stevens T. Mason Building, Lansing, Michigan. April 1, 1959 for JUNIOR grade.

HORINE, Harold H.
Assistant District Engineer of Traffic, Indiana State Highway Department, Box 467, Crawfordsville, Indiana. April 8, 1959 for JUNIOR grade.

KARRAS, Athanasios C.
Director, A. C. Karras & Associates, P.O. Box 45-31 Shenandoah Station, Miami 45, Florida. March 26, 1959 for JUNIOR grade.

LINDER, Carl E.
Director, Statistical & Tabulating Dept., Wilbur Smith & Associates, 2215 Devine Street, Columbia, South Carolina. March 23, 1959 for JUNIOR grade.

LOOPER, Joseph H.
Project Engineer, Howard, Needles, Tammen & Bergendoff, 6413 West Capitol Drive, Milwaukee 16, Wisconsin. March 19, 1959 for ASSOCIATE grade.

NELSON, Eugene E.
Assistant to Traffic Engineer, City, P. O. Box 1293, Albuquerque, New Mexico. April 6, 1959 for JUNIOR grade.

PALMER, Melville R.
Assistant Traffic Engineer, Transport Department, N. Z. Government, P. O. Box 6107, Te Aro, Wellington, New Zealand. April 7, 1959 for ASSOCIATE grade.

POWELL, Berkeley D.
Assistant County Road Commissioner, Riverside County Road Department, County Court House, Riverside, California. April 7, 1959 for ASSOCIATE grade.

POWERS, Lawrence D.
Graduate Assistant, Joint Highway Research Project, Purdue University, Lafayette, Indiana. April 6, 1959 for JUNIOR grade.

SHEELY, Henry D.
Lieutenant, Police Department, Director of Traffic Control, City, Municipal Building, Danville, Virginia. April 6, 1959 for ASSOCIATE grade.

APPLICATIONS FOR TRANSFER

CLARK, Glen L.
Senior Traffic Investigator, Oregon State Highway Department, Highway Building, Salem, Oregon. March 20, 1959 for ASSOCIATE grade.

CROCKETT, William R.
Associate Traffic Engineer, Wilbur Smith & Associates, 2215 Devine Street, Columbia, South Carolina. March 10, 1959 for ASSOCIATE grade.

DOBBINS, James B.
Traffic Analyst, San Diego Road Department, Room 014 Civic Center, San Diego, California. March 18, 1959 for ASSOCIATE grade.

PENDER, Michael R.
Civil Engineer, Madigan-Hyland, Consulting Engineers, 28-04 41st Avenue, Long Island City, New York. March 16, 1959 for ASSOCIATE grade.

WALLACE, Robert W.
Highway District Traffic Engineer, Virginia Department of Highways, Suffolk, Virginia. March 23, 1959 for MEMBER grade.

YEARBOOK CHANGES

ASTRUE, Charles J. (Associate)
Senior Transportation Engineer, California Public Utilities Commission, State Building, San Francisco, California. UNderhill 1-8700. SEND MAIL: 83 Sunnyside Avenue, Mill Valley, California.

AVERY, Eugene V. (Associate)
Assistant Chief Engineer, Department of Public Works, Room 234, City Hall, St. Paul 2, Minnesota. CApitol 4-4612, Ext. 437.

BACCHUS, Grant A. (Associate)
Traffic Planning Engineer, A. D. Margison & Associates Ltd., 30 Eglinton Avenue East, Toronto, Ontario, Canada. HUdson 1-3301. SEND MAIL: 179 Tavistock Road, Downsview, Ontario, Canada.

BERGSTROM, Donald E. (Associate)
Assistant Traffic Engineer, Bureau of Traffic Engineering, 420 S. W. Main Street, Portland 4, Oregon. CApitol 8-6141, Ext. 356.

CAL y MAYOR, Rafael (Associate)
Sub-Director of Telecommunications, Comite Nacional de Communicaciones Vecinales, Versailles, #15—7 Piso, Mexico 6, D. F., Mexico.

CLARK, Glen L. (Junior)
Senior Traffic Investigator, Oregon State Highway Department, State Highway Building, Salem, Oregon. EMpire 4-2171, Ext. 588.

CRANE, Herbert L. (Junior)
Assistant District Traffic Engineer, Michigan State Highway Department, 926 Featherstone, Pontiac, Michigan. FEderal 3-7801.

DARRELL, James E. P. (Member)
Traffic & Planning Engineer, Minnesota Department of Highways, Highway Department Building, St. Paul 1, Minnesota. CApitol 2-3013. Ext. 3141.

DECKER, James D. (Junior)
Associate Traffic Engineer, Virginia Department of Highways, 1221 East Broad Street, Richmond 19, Virginia. MIlton 4-4111, Ext. 2845.

HENSLEY, Marble J. (Member)
City Coordinator, Room 101, City Hall, Chattanooga, Tennessee. AMherst 7-6681.

LABIOSA, Victor M. (Associate)
Chief, Highway Planning & Research Division, Bureau of Traffic, Dept. of Public Works, Box 8218. Santurce 29, Puerto Rico. 2-0040. SEND MAIL: P. O. Box 812, Roosevelt, Puerto Rico.

LESSIEU, Eugene J. (Junior)
Assistant Terminals Planning Engineer, Port of New York Authority, 111 Eighth Avenue, New York 11, New York. ALgonquin 5-1000, Ext. 8064. SEND MAIL: 82-45 135th Street, Kew Gardens 35, Long Island, New York.

LEVINE, Samuel J. (Associate)
District Traffic Engineer, Michigan State Highway Department, 926 Featherstone, P. O. Box 3054. Pontiac, Michigan. FEderal 3-7801.

McKENZIE, D. W. (Associate)
Highway Engineer 1/C Design, Sacramento County, 827 7th Street, Sacramento 14, California. GIlbert 1-3461, Ext. 249.

MUELLER, Arthur P. (Associate)
District Traffic Engineer, Illinois Division of Highways, 819 Depot Avenue, Dixon, Illinois. 2-1451.

MUSICK, James V. (Associate)
Engineer, Bureau of Traffic, Ohio Department of Highways, 450 East Town Street, Columbus, Ohio. CApitol 8-5791, Ext. 26.

PAIGE, Clayton W. (Member)
Director of Public Works, City, P. O. Box 231, Burbank, California. THornwall 6-2141.

RICHTER, Jacques (Junior)
c/o Eidg. Oberbavinspektorat, Monbijoustr. 45, Bern, Switzerland.

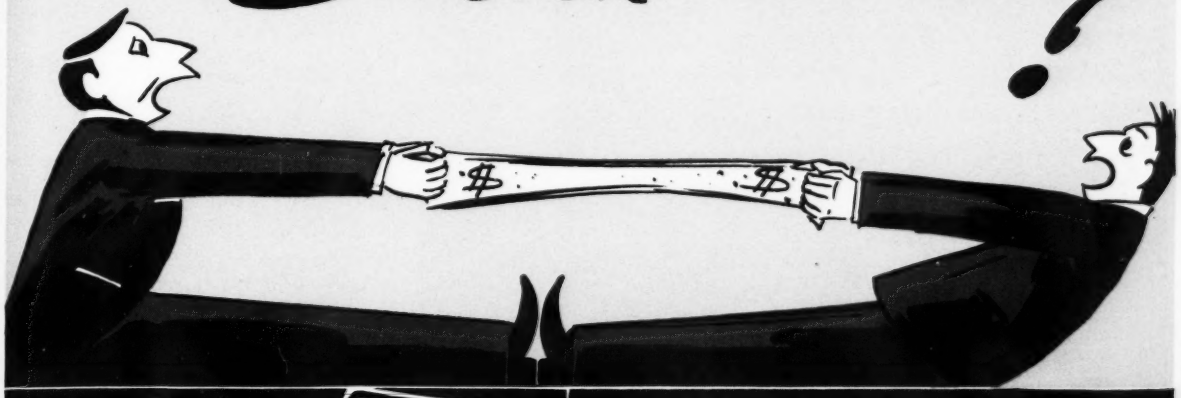
TWISS, Francis E. (Member)
Deputy Director for Traffic Engineering & Operations, Department of Highways & Traffic, District Building, Washington 4, D. C. NAtional 8-6000. SEND MAIL: 10208 Gary Road, Rockville, Maryland.

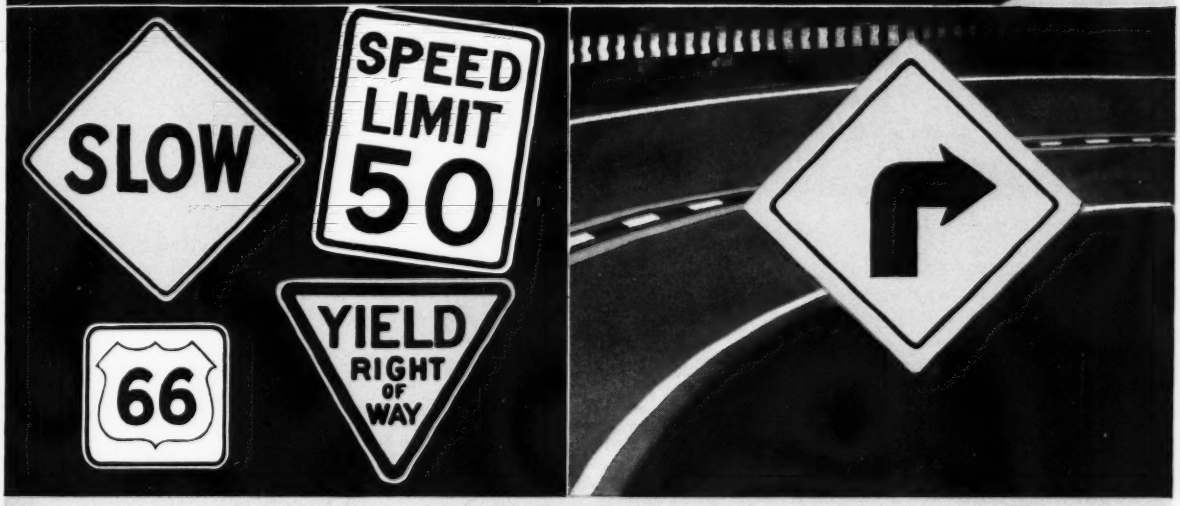
VILLEGAS, George C. (Associate)
Traffic Engineer, City, 204 East Center Street, Anaheim, California. KEystone 3-1321.

WELLER, William J. (Member)
City Traffic Engineer, Bureau of Traffic Engineering, 420 S. W. Main Street, Portland 4, Oregon. CApitol 8-6141. SEND MAIL: 7311 S. W. Brier Place, Portland 1, Oregon.

WILLISTON, Robert M. (Associate)
Senior Highway Engineer, Connecticut State Highway Department, State Office Building, Hartford, Connecticut. JAckson 7-6341. SEND MAIL: 185 Migeon Avenue, Torrington, Connecticut.

TRYING TO *Stretch* YOUR SIGN BUDGET?





SOLVE YOUR PROBLEM with FLEX-O-LITE No. 831 and UB 68 SIGN KITS

Write today for free booklet. Contains test and specification data, application procedures, and other helpful information.

If you're in a sign budget dilemma, you'll solve your problem more readily with No. 831 and UB 68 reflective glass beads. No. 831, best for white and yellow signs, and UB 68, for application to signs in the darker pigmented colors, are *lead-free* . . . won't turn dark, provide extra brilliance throughout a longer life to afford greater safety coupled with economy.

Bead budgets go farther . . . the result of Flex-O-Lite's better research and engineering and advanced methods of manufacture. And with today's overall improvements in glass bead quality, gradation, and application techniques, you have the combination that spells better reflectorized signs for less—with *lead-free* reflective glass beads by Flex-O-Lite. S-t-r-e-t-c-h *your* sign budget dollars with Flex-O-Lite, *Lead-Free* Reflective Glass Beads.

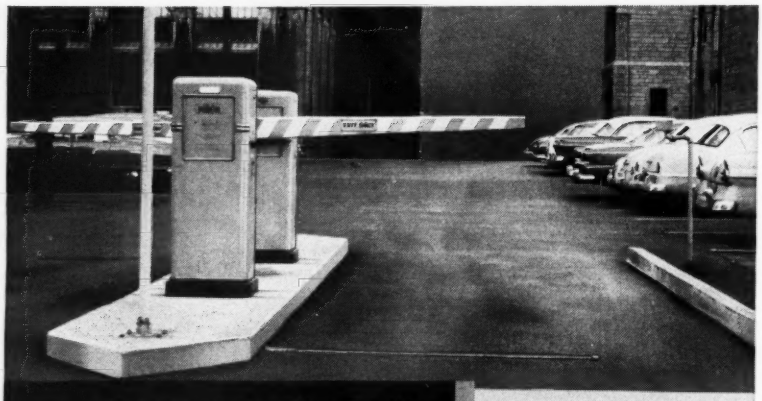
FLEX-O-LITE

FLEX-O-LITE MFG. CORPORATION

8301 FLEX-O-LITE DRIVE • P. O. BOX 3066 (AFFTON BRANCH)

ST. LOUIS 23, MISSOURI

FOR MUNICIPAL OFF-STREET PARKING



a PARCOA

Automatic Parking System

. . . will easily solve your parking problem

You have full control of parking, day and night with PARCOA—

- You do it at low cost
- You have the finest operating equipment

Efficient performance is built in by parking specialists who have provided—

- for smooth, safe, fast parking—no confusion
- for operation without costly maintenance
- for operating flexibility and dependability

PARCOA is the pioneer in automatic parking systems and the recognized leader today. PARCOA engineers can install a parking system fitted to your specific needs with the overall installation based on the many successfully operating PARCOA automatic parking systems. Find out how PARCOA parking gates can solve your problems. Write for Bulletin No. 580.

Choice territories available. Distributor inquiries invited.

A few of the Municipalities that have solved their parking problems with PARCOA.

City of Battle Creek, Mich.	City of Oakland, Calif.
City of Chicago, Ill.	City of Petersburg, Va.
City of Cleveland, Ohio	City of Port Jervis, N. Y.
City of Columbus, Ind.	City of San Jose, Calif.
City of Columbus, Ohio	City of Sioux Falls, S. D.
City of Detroit, Mich.	Town of Southington, Conn.
City of Evanston, Ill.	City of South Orange, N. J.
City of Findlay, Ohio	City of Superior, Wisc.
City of Grand Rapids, Mich.	City of Vincennes, Ind.
City of Ithaca, N. Y.	City of Watertown, N. Y.

FLEXIBLE OPERATION

These control types give you a choice of individual or combination of controls to fit your needs.

CODED CARD-KEY
for cars parking on monthly or reserved basis.

COIN OPERATION
for controlled transient parking

TICKET ISSUING SYSTEM
for merchants restricted free parking service.

TIME-DATED TICKET DISPENSER
for automatic self service in merchant participation parking.

PARCOA® DIVISION

Johnson SINCE 1909 Systems — PRODUCTS OF RESEARCH — BOWSER

JOHNSON FARE BOX COMPANY • Subsidiary of BOWSER, INC.
4619 North Ravenswood Ave., Chicago 40, Illinois • Telephone: LOngbeach 1-0217

DISTRICT FIELD OFFICES: NEW YORK: 420 Lexington Ave., New York 17, N. Y. BOSTON: 25 Southwest Park, Westwood (Boston Suburb), Mass. CLEVELAND: 4209 W. 150th St., Cleveland 11, Ohio. SAN FRANCISCO: 468 Ninth Street, San Francisco 3, Calif. DALLAS: 1706 Hinton, Dallas 19, Texas.

SALES AND SERVICE OFFICES IN OTHER MAJOR CITIES LISTED UNDER BOWSER, INC.

Coming Events

May 27-29 — ONTARIO TRAFFIC CONFERENCE CONVENTION—
Legion Memorial Hall, Sudbury, Ontario. Contact: R. F. Anderson, 2001 Eglinton Avenue, East, Scarborough, Ontario, Canada.

June 10-13—NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS—
Annual Meeting, Commodore Hotel, New York, N. Y. Contact: NSPE, 2029 K Street NW, Washington 6, D.C.

September 7-11—ILLUMINATING ENGINEERING SOCIETY—
National Technical Conference, Hotels Fairmont and Mark Hopkins, San Francisco, California. Contact: IES, 1860 Broadway, New York, N. Y.

September 14 - 17 — INSTITUTE OF TRAFFIC ENGINEERS —
29th Annual Meeting, Commodore Hotel, New York, N. Y. Contact: ITE, 2029 K St. N.W., Washington 6, D. C.

September 20-24 — AMERICAN TRANSIT ASSOCIATION—
Annual Meeting, Hotel Leamington, Minneapolis, Minn. Contact: ATA, 355 Lexington Avenue, New York 17, N. Y.

October 11-16 — AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS—
Annual Meeting, Hotel Statler - Hilton, Boston, Massachusetts. Contact: AASHO, 917 National Press Bldg., Washington 4, D.C.

October 19-22 — INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION—
Annual Conference, Stardust Hotel, Las Vegas, Nevada. Contact: IMSA, 130 West 42nd St., New York 36, N. Y.

SUSTAINING ORGANIZATIONS

Added since March 5, 1959:

Duncan Parking Meter Division of Motor Products Corporation
835 North Wood Street Chicago 22, Illinois
R. J. Smott, Representative

Change of Representative:

Cataphote Corporation
W. L. Lowry, Representative

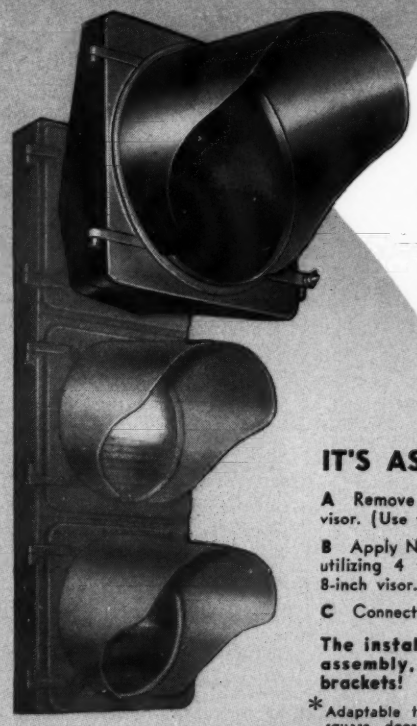
NEW APPOINTMENTS

(Continued from page 34)

Marble J. Hensley—formerly the Director of the Traffic & Planning Department for Chattanooga, Tennessee; now has the position of City Coordinator.

Charles W. Waters—was an Associate Partner in the firm of DeLeuw, Cather & Brill in Buffalo, New York; is now an Associate Engineer, McFarland-Johnson, Consulting Engineers, also in Buffalo.

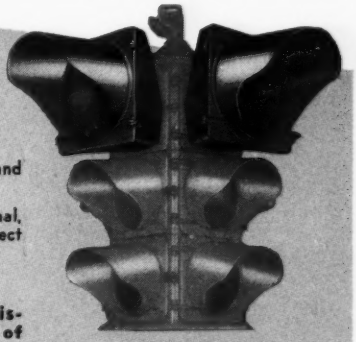
Edward G. Wetzel—now Special Assistant to the Director, Port Development Department, Port of N. Y. Authority — was Assistant Chief, Planning Division.



MODEL KB331
Patent Applied For

EAGLE'S NEW 12-INCH SIGNAL ADAPTER

modernizes existing traffic signals rapidly and inexpensively . . . . regardless of make.*



Applies perfectly as your solution to 12-inch red indications on square, non-adjustable type signals.

IT'S AS SIMPLE AS A. B. C!

A Remove present 8-inch optics, including lens and visor. (Use the components for spares).

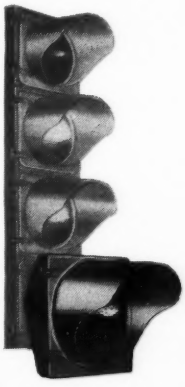
B Apply NEW adapter to door of your 8-inch signal, utilizing 4 tapped holes previously used to connect 8-inch visor.*

C Connect socket leads to terminal block.

The installation eliminates all need for disassembly, rearrangement or replacement of brackets!

*Adaptable to all conventional 8-inch signal heads having square doors. Most installations will utilize holes previously used to attach visors. Fasteners and instructions furnished in kit for installations requiring the drilling of new holes.

Within Minutes YOU HAVE THE ADDED COMMAND OF MODERN 12-INCH SIGNAL INDICATIONS!



. . . with the superior features of all Eagle Traffic Signals, including —

- **Lightweight cast aluminum body.**
- **Stainless steel outside hardware.**
- **Dustproof and waterproof. Neoprene gasketing throughout.**
- **Adjustable lamp socket. Easily focused, yet held firmly in the plane of maximum efficiency.**
- **Same highly efficient optics.**

Applies neatly and effectively to all modern 8-inch traffic signals. Gives every indication of belonging . . . does not look tacked on! Advance plane of the adapter face gives added "punch" and aids in shielding the balance of the signal indications from overhead light reflection.

ADAPTABLE TO ANY NEED
. . . at the top as a 12-inch red.
. . . at the bottom as an arrow indication.

This new 12-inch signal adapter comes to you in one easy-to-install package, complete with 150 watt lamp. More often than not, all you'll need in addition is a screwdriver for installation.

Contact your nearest Eagle representative or mail coupon today!

EAGLE SIGNAL CORPORATION, Municipal Division
Dept. TE-559, MOLINE, ILLINOIS

☐ Send Sales Representative for first-hand demonstration

☐ Send Prices & Best Delivery on _____ KB331 12-inch adapter kits.

NAME AND TITLE

ORGANIZATION

FULL ADDRESS

By Popular Demand

A HANDY AND DISTINCTIVE BINDER FOR 12 ISSUES OF TRAFFIC ENGINEERING

Now you can build an easy reference library to the many fine articles and technical reports which appear in TRAFFIC ENGINEERING. Slip each monthly issue into this handsome new blue and gold binder. It holds up to twelve issues, and will make a most attractive addition to your office or home library.

The binder has twelve removable steel rods which are easily operated to put copies in (or to remove them if necessary). The binder is beautifully finished and has a reinforced stiff back which is lined for greater wear.

order yours today **$3.00** postpaid

TRAFFIC ENGINEERING 2029 K Street, NW, Washington 6, D.C.

Please send me ..... binders, postpaid.

I enclose $ ..... ☐ Bill me.

Name .....
Please Print

Address .....

City ..... Zone ..... State .....

STRICTLY BUSINESS

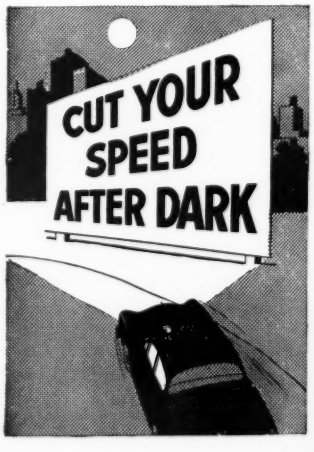
(Continued from page 42)

is simple. In addition, not only regular civilian office employees, but police personnel as well, can marginally notch and sort the cards. The cards are furnished to local police for a nominal sum by the Foundation, a non-profit organization devoted to reducing traffic accidents.

Basically the keysort accident card provides a quick and easy way to produce traffic statistics to guide programs. Cooperating cities and counties using the new National Safety Council form now find it possible to fill in virtually all sections from the information tabulated from the keysort cards.

The Foundation has found that the system contributes data to serve these purposes: (1) Development of selective enforcement programs aimed at specific types of accidents, time of day accidents, location and ages involved, (2) Special studies of high accident locations and development of remedial, engineering measures, (3) Development of educational programs for use by press, radio, TV and public speakers, (4) Special studies involving school-age persons for use by teachers, student councils, PTA and other interested groups. (5) Follow-up studies to measure the effect of remedies that have been applied.

The Foundation recommends that besides annual summaries for all class-



es of cities, that those under 10,000 population should also issue a semi-annual report; cities in the 10,000 to 25,000 brackets quarterly and over 25,000 that monthly reports should be issued.

Cypak Static Control Parks Cars at N. Y.'s International Airport

One Cypak control system *not* at work producing tangible goods is now serving as a parking attendant at New York International Airport's semi-automatic parking lot. As a driver approaches the gate, a magnetic coil beneath the

road senses the presence of the car and causes the ticket dispenser to stamp the date and time on a ticket. The driver has only to accept the ticket from the machine. Then the Westinghouse system permits the car to enter by raising the parking lot gate. The gate closes when the car passes over a second magnetic coil.

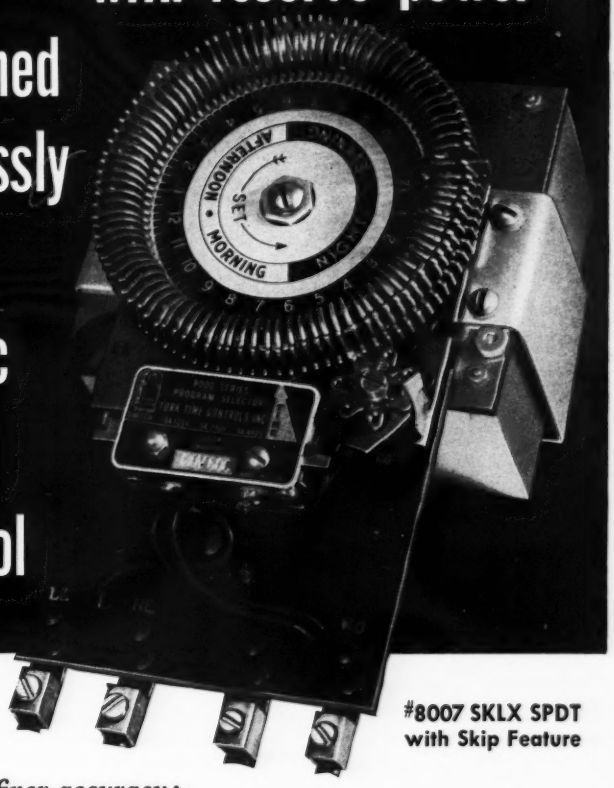
The Cypak system can also adapt itself to a steady stream of incoming cars. For instance, if one driver is passing through the gate just as a second driver receives his ticket, the system leaves the gate up or, if the gate has started to close, it causes the gate to stop immediately and then to rise.

The system pleases not only air travelers, but also the Port of New York Authority. With relay control of three entrance lanes many man-days were required to keep them operating properly. The absence of moving parts from Cypak control systems has meant no failures of this equipment in seven months of service.

Although first marketed by Westinghouse to the machine tool industry for highly automatic metal-working machines, Cypak systems are now used in nearly every industry in which uninterrupted production is important, according to the company.

New TORK
PROGRAM TIME SWITCH
with reserve power

Designed Expressly For Traffic Signal Control



#8007 SKLX SPDT
with Skip Feature

Gives you finer accuracy:

- 96 tabs on 24 hour dial permit 15-minute switching changes.
- Tabs easily tilted in or out by hand.
- 1 to 48 operations a day—15-minute minimum setting.
- Switch position stays the same when adjacent tabs are set alike.
- No conventional ON-OFF trippers to slide around the dial.

Gives you these EXCLUSIVE safety features:

- Keeps time for more than 20 hours after power failure.
- Reserve Spring rewinds electrically 10 times faster than used.
- Reserve spring is automatically "exercised" each day — no chance of locked up spring failing to take over when needed.

Here's the safest, most accurate time switch made for traffic signal control. Enthusiastically acclaimed and specified by those who have seen and tested. it. WRITE NOW TO DEPT. T-1 FOR FULL DETAILS.

TORK TIME CONTROLS, INC.
MOUNT VERNON, NEW YORK

In Canada: DOMINION ELECTRIC MANUFACTURING CO., LTD., TORONTO

Professional Service Directory

DE LEUW, CATHER & COMPANY
CONSULTING ENGINEERS
Public Transit — Subways
Traffic & Parking — Railroad Facilities
Expressways — Industrial Plants
Grade Separations — Municipal Works
Urban Renewal — Port Development
150 North Wacker Drive, Chicago 6
San Francisco — Toronto — Oklahoma City

EDWARDS AND KELCEY
ENGINEERS AND CONSULTANTS
HIGHWAYS — STRUCTURES
TRAFFIC — PARKING
TERMINAL FACILITIES
3 WILLIAM ST., NEWARK 2, NEW JERSEY
BOSTON — NEW YORK
SALT LAKE CITY — MINNEAPOLIS

RAMP CONSULTING SERVICES, INC.
Parking & Traffic Surveys — Design Services
Parking Programs — Feasibility Studies
2 West 46th Street, New York 36, N. Y.
Formerly Consulting Service Division
Ramp Buildings Corporation

ALFRED KAEHRLE ASSOCIATES
CONSULTING ENGINEERS
Highway Planning — Highway Design
Traffic Engineering Surveys
Parking Studies — Shopping Centers
10 North Main Street
West Hartford 7 — Connecticut

GEORGE W. BARTON & ASSOCIATES
CONSULTING ENGINEERS
Traffic — Transportation
Parking — Highways
600 Davis Street
Evanston — Illinois

FREDERICK L. BELL & ASSOCIATES, Inc.
CONSULTING ENGINEERS
Traffic and Parking Surveys
Street and Highway Design
Suite 110 Petroleum Bldg.
Phone 2-0359
Tallahassee — Florida

CRAWFORD, MURRAY & TILLY
CONSULTING ENGINEERS
Water Works - Impounding Reservoirs
Highways - Municipal Streets - Expressways
Traffic Problems - Airports
Swimming Pools
Sewers - Sewage Treatment
Waste Treatment - Storm Drainage
Flood Control - Surveys and Reports
755 So. Grand Ave., W.; Springfield, Ill.
Lakeside 8-5619

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
Consulting Engineers
Traffic Analyses — Transportation Studies
EXPRESS HIGHWAY PLANNING
REPORTS AND DESIGN
ADMINISTRATIVE SERVICES
1805 Grand Avenue
Kansas City 8, Missouri
New York — Cleveland

Highways — Traffic — Parking — Transit
WILBUR SMITH & ASSOCIATES
495 Orange Street
New Haven, Connecticut
Columbia S.C. • San Francisco Calif. • Richmond Va.

Your Car Ten Years Ago vs. Today

Ever think just what has happened to the average U.S. car in the past ten years? Sure, some parking garages refuse to take certain 1959's—and a parking lot for small cars has opened in Washington, D.C., but how about the average cars?

Here are some figures, published by U.S. Rubber:

	1948 Average	1958 Average	Difference
Over-all Length	199 in.	213 in.	14 in. longer in '58
Over-all Width	73.8 in.	78.7 in.	5 in. wider in '58
Height	64 in.	57 in.	7 in lower in '58
Weight	3,647 lbs.	4,022 lbs.	375 lbs. heavier in '58
Horse-power	From 70 to 160 BHP	From 92 to 375 BHP	150 BHP Avg. 125% increase!
Power Steering	Not avail.	Avail. on 97% of models Standard on 22%	
Power Brakes	Not avail.	Avail. on 97% of models Standard on 22%	

INDEX TO ADVERTISERS

A'G'A Division of Elastic Stop Nut Corporation 41
Aluminum Company of America 37
Automatic Signal Division of Eastern Industries 8
Cataphote Corporation 5
Dresser-Ideco Company ..... 30 & 31
Duncan Parking Meter Corporation 33
Duro-Test Corporation 51
Eagle Signal Corporation 55
Electronic Protection, Inc. 39
Flex-O-Lite Manufacturing Corporation 53
Johnson Fare Box Company 54
Kaiser Aluminum & Chemical Co. 4
Kerrigan Iron Works, Inc. 43
Line Material Industries 37
Magee-Hale Park-O-Meter Company 35
Marbelite Corporation 38
Minnesota Mining & Manufacturing Co. 2
Municipal Street Sign Company 47
Pfaff and Kendall 3
Planet Corporation 32
Prismo-Wald Safety Corporation ..... Back Cover
Radiator Specialty Company 47
B. G. Reilly Company 22
Rockwell Dual Manufacturing Company 6
G. H. Tennant Company 49
Tork Time Controls, Inc. 57
Veeder Root, Inc. 51
Western Industries, Inc. 29
Winko-Matic Signal Company 48

Professional Service Directory

TRAFFIC ENGINEERING — HIGHWAY PLANNING

BRUCE CAMPBELL & ASSOCIATES
ENGINEERS

177 MILK STREET • BOSTON 9

PARKING — AIRPORTS — SHOPPING CENTERS

THE H. K. FERGUSON COMPANY
ENGINEERS AND BUILDERS

PARKING AND TRAFFIC SURVEYS • ECONOMIC STUDIES
GARAGE DESIGN AND CONSTRUCTION

New York - Cleveland - Cincinnati - Chicago - Atlanta
Los Angeles - San Francisco - Toronto - London

PALMER AND BAKER ENGINEERS, INC.
CONSULTING ENGINEERS — ARCHITECTS

Surveys — Reports — Design — Supervision — Consultation

Transportation and Traffic Problems Tunnels Bridges Highways Airports
Industrial Buildings Waterfront and Harbor Structures
Graving and Floating Dry Docks
Complete Soils, Materials and Chemical Laboratories

Mobile, Ala. New Orleans, La. Washington, D.C.

GANNETT FLEMING CORDDRY and CARPENTER, INC.
---ENGINEERS---

CONSULTING SERVICE FOR TRAFFIC, PARKING and TRANSPORTATION PROBLEMS
City Planning — Highways — Bridges — Flood Control
Water Supply — Sewerage — Industrial Waste — Garbage Disposal
Appraisals — Investigations — Management

600 NO. 2nd STREET HARRISBURG, PA.
Pittsburgh, Pa. Philadelphia, Pa. Daytona Beach, Fla. Medellin, Colombia, S.A.

ERNEST E. BLANCHE & ASSOCIATES, INC.
SPECIALISTS IN PROCESSING TRAFFIC DATA

Card Punching, Tabulating, Computing On Our Own IBM Electronic Equipment. Mathematical and Statistical Analysis. Programming for Manual, Punch Card and Tape Computers.

Origin — Destination Studies — Trip Projections to Future Years
Refinements by Successive Approximations — Trip Assignments to Expressways and Transit
Economic Studies — Parking and Traffic Analysis — Highway Design
Earth Work Computations

10419-25 FAWCETT STREET KENSINGTON, MARYLAND
(3 Miles from Washington, D.C.) LOckwood 4-7527

TRANSPORTATION PROBLEMS
HIGHWAYS

THE CLARKESON ENGINEERING COMPANY
INCORPORATED

285 Columbus Ave., Boston 16, Mass.
COmmonwealth 6-7720

EXPRESSWAYS AIRPORTS

HIGHWAY TRAFFIC ENGINEERS, INC.

Traffic - Parking - Transportation
Economic Studies - Financial Reports
Traffic Control - Design of Lighting Systems and Communications

361 Boylston Street
Brookline 46, Massachusetts
LOngwood 6-0275

PARSONS, BRINCKERHOFF HALL & MACDONALD
Engineers

Bridges, Highways, Tunnels, Airports, Subways, Harbor Works, Dams, Canals, Traffic, Parking and Transportation Reports, Power, Industrial Buildings, Housing, Sewerage and Water Supply.

165 Broadway New York 6, N. Y.

HARDESTY & HANOVER
CONSULTING ENGINEERS

BRIDGES — Long Spans of All Types
Moveable — Lift, Bascule & Swing
Hanover Skew Bascule
Grade Crossing Eliminations
Other Structures Foundations
Expressways and Thruways
Design — Supervision — Inspection
Valuation — Reports

101 Park Avenue New York 17, N. Y.

S. Herbert Taylor Frank J. Sleeper
David L. Taylor William H. Taylor

SHERMAN, TAYLOR & SLEEPER
CONSULTING ENGINEERS
(All phases of Civil Engineering)

501 Cooper Street, Camden 2, N. J.
WOodlawn 6-2552

Park & Norwood Aves., Merchantville 8, N. J.
NOrmandy 3-4848

JENKINS, MERCHANT & NANKIVIL
Consulting Engineers

Municipal Improvements Gas Systems
Highways & Airports Water Systems
Power Development Sewerage Systems
Traffic Surveys Industrial Plants
Flood Control Recreational Facilities
Investigations and Reports

801-805 East Miller St. Springfield, Ill.

TIPPETTS — ABBETT McCARTHY — STRATTON
Engineers
Traffic, Parking and Transportation

Surveys, Economic Studies and Financial Reports

Highways, Subways, Bridges, Tunnels—Airports, Ports, Harbors, Power Developments, Water Supply, Sewerage

Planning, Reports, Design, Supervision of Construction

375 Park Avenue New York 22, N.Y. 110 Market St. San Francisco, Cal.

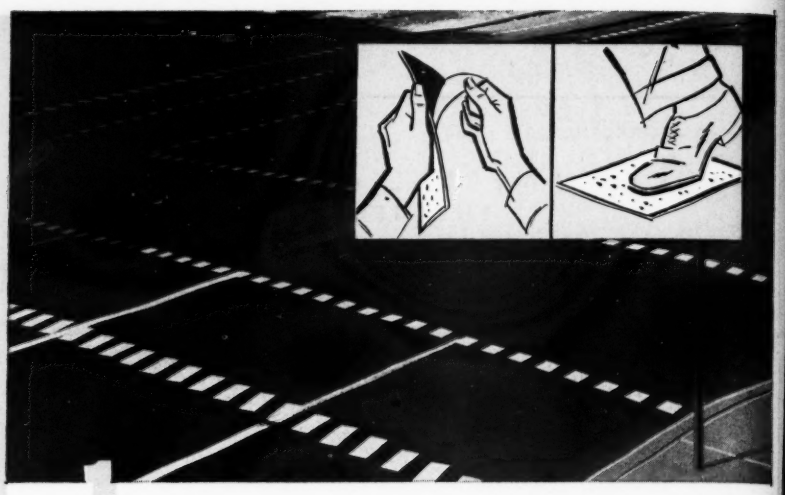
HOWARD S. LAPIN
TRANSPORTATION PLANNING CONSULTANT

Transportation studies in area planning. Research, Planning, Economics.

Suite 703 Hamilton Bldg. 3818 Chestnut St.
Philadelphia 4, Pa. BAring 2-5747

3 STEPS To a Better Street Marking Program

At Lower Cost Per Year



Step 1

Install Prismo Reflectorized PLASTIX "SD" on Crosswalks, Safety Zones

Revolutionary permanent-type marker with simple one-step installation method. No adhesive application, no solvents, no equipment, no warm-up needed. Saves time and labor costs. No traffic tie-up. Retains maximum reflectivity up to 6 years.

Step 2

Swing to WALD'S Town and County Push-button striper— for center line, lane divider and curb marking

This striper is the last word in high production striping efficiency. Gives you more lines for your striping dollar. Maneuverable and versatile; can hop speedily from one location to another. Finger tip control of all line patterns.

Step 3

Use PRISMO Municipal Lifeline

on all Street Markings where reflectorized paint is indicated

One-application reflective striping developed specifically for city street economy. Easy application and quick-drying reduces traffic delays. Amazing durability with Prismo's exclusive "Moisture-Proofing" feature.

Write for information on the Town and County Striper to

WALD
INDUSTRIES, INC.
Huntingdon, Pennsylvania

Write for information on Plastix "SD" and Municipal Lifeline to

PRISMO
SAFETY CORPORATION
Huntingdon, Pennsylvania